Location	B29 No	Plant No	Leaf Count ½" more	Caliph.	Root Length	Height of Top	Net Green Weight of Plant	Weight Defeated Plant	Dry wt of Defeated Plant	
E. Smart										
Minnegenew	2	1	15	1/4"	24"	3"		2.3		
Kalgoorlie	17	1	175	7/20	12"	7"		14.7		
"	"	2	50	1/4	~~9"~~	~~5~~"		5.2		
Grigg Scaddan	309	1	~~90~~	3/10	7½	5"		7.0		
"	"	2	80	3/10	~~10"~~	3½		7.4		
"	"	3	70	3/10	12"	3½		6.3		
Jerramungup	315	1	30	1/4	7½"	7"		2.0		
"	"	2	20	1/5	10"	3"		1.4		
" (Natural Seedling)	"	3	15	3/20	7"	3"		1.0		
Salmon Gum	24	1	276	2/5	4½"	7"		16.9		4yr.
Esperance	308	1	76	3/5	6"	5"		19.1		
"	"	2	44	7/10	7"	3"		8.2		
"	312?	1	57	2/5	7"	3"		11.4		
"	"	2	32	2/5	7"	3"		9.0		
Smaller " seedling (19yr old)	"	1	9	3/20	9"	2"		.5		
Salmon Gum	3									
" Tak										

MANZ 3329

March 14, 1944

MEMO RECEIVED FROM PROFESSOR STEBBINS ON CONTINUATION OF KODANI'S WORK ON GUAYULE GENETICS.

1. Grow seed harvested from supposed hybrid parents, along with seed from parent types, and note variability.

2. Choose 2 or 3 numbers from series A 6101 to A 6120, germinate, and treat with colchicine.

   Directions for colchicine treatment. Germinate seed on damp paper in moist chamber, or on surface of bed. At beginning of germination, transfer to covered dish of colchicine solution, recommended concentration 0.2%, freshly prepared. Try treatments of 1 and 2 hours, with controls having no colchicine. After treatment, put seeds back on surface of seed bed, and keep dry as possible without destroying ability to continue germination. Seeds are expected to be dormant for 1 to 3 weeks after treatment. If treatment has been successful, unusually thick leaves or possibly cotyledons will emerge when growth starts. Keep in warm well lighted green house or lath house.

   If treatments fail to produce results or kill the germinating seeds, try higher and lower concentrations, and longer and shorter times. Emerson would suggest, before making series of treatments on different numbers from A-61 series, running a test on exposure time and concentration, to find out time and concentration which may be expected to produce most results without injury. Suggest concentrations of 0.04%, 0.2%, and 1%, and treatments of 15 minutes, ½ hour, 1 hour, 2 hours, and 4 hours. Make about 25 ml. of 1% stock solution, and dilute for lower concentrations.

   Send to Stebbins about 1000 each of, seed, of 2 or 3 numbers from A-61 series, carefully labeled, and keep record of parent plants.

   After establishing dependable technique for colchicine treatment with A-61 seed, start seedlings from 36-chromosome material obtained from Powers, as well as untreated controls from A 61 seed. Attempt hybridizations between treated and untreated plants this summer.

   Colchicine treatment can also be tried on cuttings of Powers 36 chromosome material and A61 material.

3. Plant seed of "Lopey" Mexican material, A7308 and others, and get as many seedlings as possible.

4. Grow about 100 seedlings from mass-collections of Texas seed, taken from plants grown from Texas 1, Texas 2, and Texas 2500, 3000, and 3500. Look for frequency with which each of the Texas types occurs in these samples of 100 seedlings. Mass collections should be only from plants from one of the original 5 localities, not mixed seed from plants of all localities.

Texas types A,B,C,E, are supposed to occur as follows:

Texas 1 (near Green Valley, Presidio County) 90% A type, 10% B type. (280/22)

Texas 2 (7 mile-mesa, Fort Stockton, Pecos County) 1/6 A type, 5/6 B type (300/50)

Texas 2500 (Marathon, Brewster County) All B type, 285 plants.

Texas 3000 (same locality) All B type, 12 plants.

Texas 3500 (same locality) Types B,C, possibly E.

Powers calls type A "intermediate"; type B "or ranch type"; type C "Balmorrhea type."

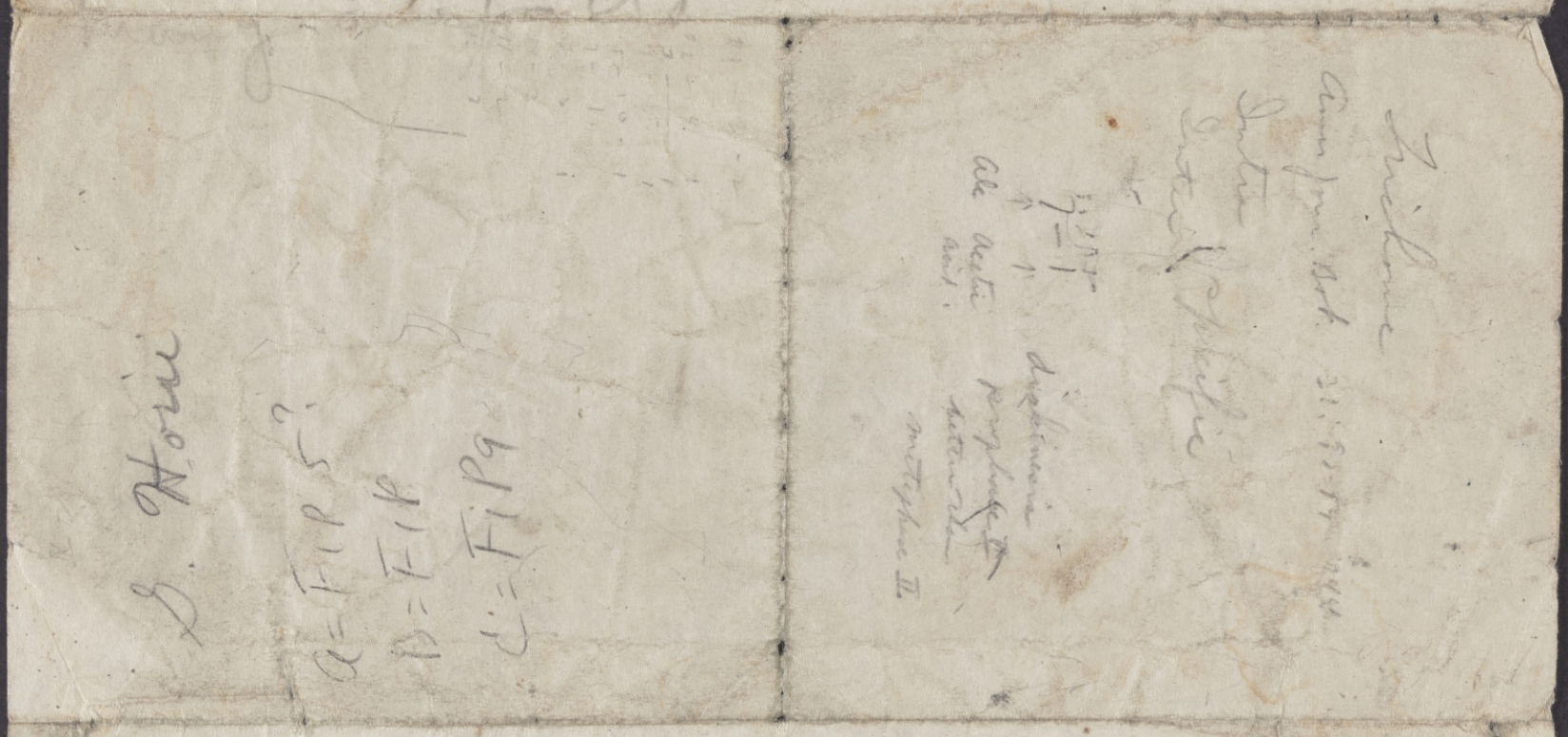
James Meyer, Nov. Stain Tech.

Grow in sterile sand, 2 mo. to 1 yr.
roots grow through to Hoagland's, aerated
through cracks, then replace it.
with sat. sol. p-dichlorobenzene
~~dist. water~~; sat. by standing
in warm room. Roots sit in this
6½ – 3 hr. Supposed to break up
spindle & separate chromosomes.
Important to use razor, straight
cut. Mash causes chromosomes to
clump. No scissors. Kill &
fix in 6:3:1 gf. H.A.C. Then
hydrolyze at 60° C. in 10%
HCl., max. time 20', depending
on plants. Then stain w. aceto
orcein. Smash cells, irrigate
continuously with stain, through cover
slip, until low-power inspection
shows good staining. Then squash

final smash, & make semi permanent mount.

Write James Meyer, Tennessee address from Berger.

#1 ct.



MANZ 3329

Comparison Of Plant Growth From Different Locality

Location of Plants	Seedlings From	Crown Diameter of Seedling	Crown Diameter when Pulled	No of Mo. Growing in Field	Leaf Count ½" or over	Root Length	Height of Vegetative Growth	Wt. of Defoliated Plant
MINGENEW	WEMBLEY	Over 1/8 in	1/4 in	4½ mo.	15	24 in	3 in	2.3 gr.
KALGOORLIE	"		7/20 in	4½ mo.	175	12 in	7 in	14.7 gr.
"	"		1/4 in	4½ mo.	50	9 in	5 in	5.2 gr.
SCADDAN	"	1/16 to 1/8 in	3/10 in	4½ mo.	90	7½ in	5 in	7.0 gr.
"	"	" "	"	4½ mo.	80	10 in	3½ in	7.4 gr.
"	"	" "	"	4½ mo.	70	12 in	3½ in	6.3 gr.
JERRAMUNGUP	"	" "	1/4 in	4 mo.	30	7½ in	3 in	2.0 gr.
"	"	" "	1/5 in	"	20	10 in	3 in	1.4 gr.
"	"		3/20 in	"	15	7 in	3 in	1.0 gr.
~~SALMON GUM~~ (Natural seedling)	~~—~~	~~—~~	~~2/5 in~~	~~2 yrs (Approx)~~	~~276~~	~~4½ in~~	~~7 in~~	~~16.9 gr~~
ESPERANCE No zinc, copper or Super-phos.	CANARVON	1/4 to 1/2 in	3/5 in	2 mo.	76	6 in	5 in	19.1 gr.
"	"	" "	7/10 in	"	44	7 in	3 in	8.2 gr.
ESPERANCE zinc, copper + super-phos dressing	"	" "	2/5 in	"	57	7 in	3 in	11.4 gr.
"	"	" "	2/5 in	"	32	7 in	3 in	9.0 gr.
ESPERANCE	WEMBLEY	1/16 to 3/16	7/20 in	4½ mo.	9	9 in	2 in	.5 gr.
SALMON GUM	—	—	2/5 in	2 yrs (Approx.)	276	4½ in	7 in	16.9 gr.
" "			2 in	18 yrs		8 in	15 in	1673.4 gr.

Comparison Of Plants From Different Locality

Location where plant came from	Plant No.	Leaf Count ½" or over	Caliper of root near crown	Root Length	Height of Top	Wt. defoliated plant

Rubber Extraction

Location Where plants Came From	Plant No.	Leaf Count ½" or over	Caliper of root near crown	Root Length	Height of top growth	Wt. of Defeated plant Gram	Wt. of Sample	Wt of Rubber	% of Rubber
~~Jerramungup~~	1	30	½"	7½"	3"	2.0			
Salmon Gum (large 18 yrs old)	1		2"	8"	15"	1677.4 gr.	21 gr.	1.08 gr.	5.1%
Esperance	~~From plot without zinc, copper~~						~~45 gr.~~	~~.26 gr.~~	~~1.7~~
(From plot with zinc, copper & Super phos. dressing)							10 gr.	.10 gr.	1.0%
Esperance (From plot without dressing)							15 gr	.26 gr.	1.7%
Salmon Gum - Natural seedling							13.5 gr	.36 gr.	2.7%
Scadden							14.2 gr	.89 gr.	6.3%
Kalgoorlie							11½ gr	-0-	—

MANZ 3329

- 2 -

Following are the rainfall and temperature just before and after transplanting.

Month	RAINFALL Inches	TEMPERATURE Average Minimum	Average Maximum	Highest	Lowest
September	.34	48	70.8	86.8	36.1
October	.11	52.2	79.6	89.1	43.6
November	.79	56.5	85.6	105.1	46.
December	1.63	57.4	83.9	97.8	46.
January	2.27	62.4	90.3	106	50.8

Average rainfall 9.46

September	Average Minimum	Average Maximum	Highest	Lowest
	62.4	90.3	106.8	50.8

RUBBER EXTRACTION

Location where plant came from		Wt of Sample	Wt of Rubber	% of Rubber
Salmon Gum	Large 18yrs. old	21 gr.	1.08 gr	5.1%
Salmon Gum	Natural seedling	13.5 gr	.36 gr	2.7%
Esperance	From plot with zinc, copper, super-phosphate dressing	10 gr	.10 gr	1.0%
		~~13.5 gr~~	~~36 gr~~	~~2.7%~~
"	From plot without dressing	15 gr	.26 gr	1.7%
Scaddan		14.2 gr	.89 gr	6.3%
Kalgoorlie		11.5 gr	-0-	—

~~Aug~~ Feb '60

needs calc for rubber accumulation in plant.

MANZ 3329

Use several strains

Mariola is only in the picture because it introduces an easily identifiable character.

procedure: emasculating guayule flowers,

leaving ± 10 % unpollinated,

pollinating ± 90 % with mariola pollen,

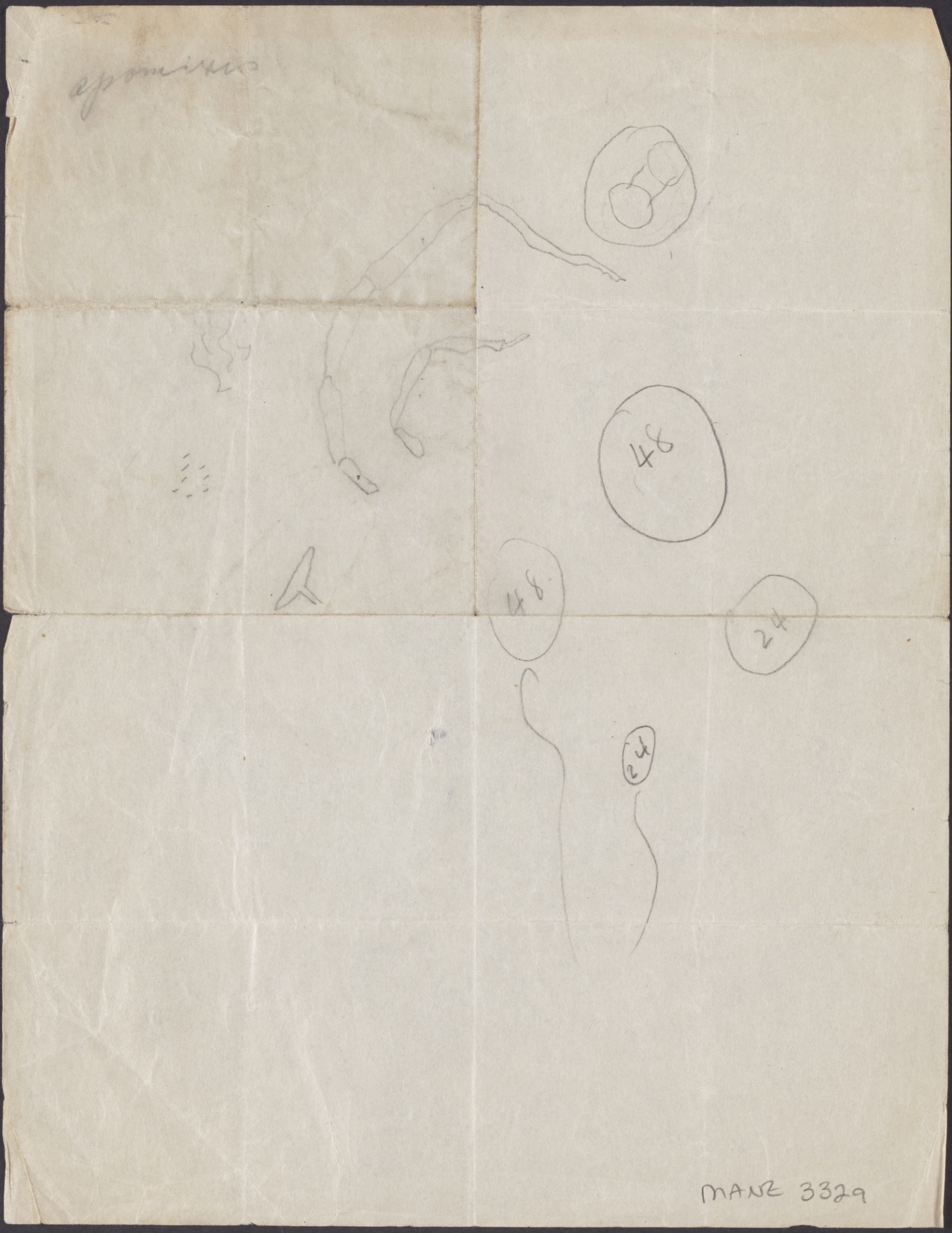
bagging

question: 1. Do any unpollinated flowers ~~give~~ give viable seed?

2. How many % of the seed from mariola pollinated guayule flowers are the result of fertilization and apomixis respectively?

what % will be like guayule, showing that apomixis took place, and what %, like Mariola, showing that fertilization took place?

36
108
72



MANE 3329

+ = normal (2n = 36) pg = pale green (2n = 36)

pg ♀ × + ♂ + ♀ × pg ♂

↓ a

F_1: $\frac{pg}{+}$ selfed and backcrossed to both + and pg

purpose: Is pg dominant or recessive to + ? Is it a single pair of factors?

+ guayule (2n = 36) ♀ × mariola ♂

pg

♀

↓

F_1 ♂

+ ♀ pg ×

↓

+ ♀ pg × BC ♂

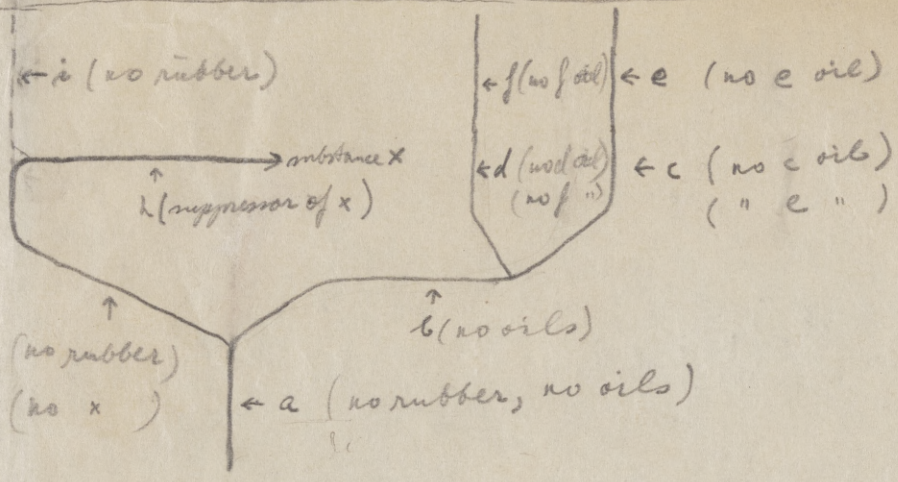
Parthenogenesis

Partheno - maiden

Apomixis

MANZ 3329

Desirable genotype: A b b G h h I



Hypothetical example of chemical reaction chain

In all crosses two standards should be used:

Diploid (2n = 36) "+" "pragnle and Diploid (2n = 36) "pale green" pragnle

Which pale green?

Where tetraploids (2n = 72) are crossed to the standards, the standards should be used as female parents in all crosses. Reason: the unbalanced (n +.) pollen grains will probably be inviable; thus the balanced (n or 2n) pollen are naturally selected for, and the diploid (2n = 36) condition will be restored after the first back. cross. (This applies to both pragnle and mandola crosses).

Where chromosome counts are desirable, root tip rather than pollen mother cells are to be used.
because no need to wait for flowers

Purpose of all crosses: To get a number of single gene

differences preferably concerned with the formation chemicals (rubber, essential oils etc.) to work out a chain of reactions similar to the model given above.

First step:

check chromosome # for p.g. + "+" n=36?

2nd isolate gene for pale green by back crosses?

3rd isolate gene for leaf type or leaf hair, or some morphological character not requiring chemical analysis, just to show that the method works.

4th Select for ♂ parents for initial crosses, those differing as widely as possible in rubber and oil content.

MANZ 3329

TABLE 1 INCIDENCE OF TRIPLOIDS IN *P. argentatum*

Strain	Total number of Plants	Number of Triploids	% of Triploids
111 S11	139	2	1.5
49 S49	12	1	8.3
405	109	18	16
406 S46	94	15	16
407	13	1	8
420 S20	58	8	13
427 S27	29	5	177
428 S28	53	26	49
593 93	957	60	5.9
Texas A	443	4	0.9
Texas B	717	1	0.14

Table 2 Meiotic Irregularity

P.argentatum	Chromosome number
406	74
428 (an)	72
428 (3n)	108
A7301	72-74
Texas A (Ft. Stockton)	74
Texas B (Ft. Stockton)	74
Texas C (Marathon)	74
109	54
111	58
A6104	36
A6107	36
A7308	38
P.incanum	
Mexico (Lopez)	72
Socorro, New Mexico	72
Alpine, Texas	54

Table 3 Pollen Fertility and Seed Set

Strain P.argentatum	Pollen in Percentage				Percentage Seed Set
	Normal Size		Giant	Small	
	Good	Bad			
406	76.7	18	4	1.3	34
428)2n)	85.5	6.2	8.3	0	45
428 (3n)	76.6	20.8	1.3	1.3	2.7
A7301	64.4	22	4	9.6	62
Texas A	64.8	23	2.2	10	33
Texas B	86.1	10	3.4	0.5	47
Texas C	69.9	25.6	3.1	1.4	40
109	75.2	15	2.5	7.3	38
111	74.06	22	0.44	3.5	31
A6104	97.8	0.4	1.4	0.4	46
A6107	92.3	5.4	2.3	0	48
A7308	85.7	12	2.1	0.2	45
405 (1n)	7.7	92	0.3	0	0
P.incanum					
Mexico (Lopez)	79	13	5.5	2.5	33
Socorro, New Mexico	72.5	24	2.7	0.8	50
Alpine, Texas	59.8	38	1	1.2	26

LEGENDS FOR FIGURES

Figures 1-10. Somatic chromosomes from root tips. 1-7, Parthenium argentatum: 1, Salinas strain 405, 2n=72; 2, Salinas strain 407, 2n = 74; 3, Salinas strain 109, 2n = 54; 4, Salinas stain 111, 2n = 58; 5, "Autotriploid" from Salinas strain 593, 2n = ca.111; 6, "haploid" from no. 405, 2n = 36; 7, Lopez no. A7308, 2n = 38; 8-10, P. incanum: 8, from Alpine Tex., 2n = 54; 9, from Superior Ariz.; 2n = 72; 10, from Alpine, Tex., 2n = 90. All figures reproduced x 1250.

Figures 11-15. First division of microspore meiosis in P. argentatum. 11, no. 406, diakinesis, showing 2 quadrivalents, 1 trivalent, 31 bivalents, and 1 univalent. 12, no. 109, showing 3 trivalents, 20 bivalents, and 5 univalents. 13, no. A6107, showing 18 bivalents. 14, "haploid" from no. 405, showing 17 bivalents and 2 univalents at first metaphase. 15, no. A7308, showing 18 bivalents and 2 small univalents. All figures reproduced x 1250.

Figure 16. 1-2 year old plants growing at Berkeley of P.argentatum strain no. 109, 2n = 54 (left), no. 593, 2n = 74 (center)and autotriploid from no. 593, 3n = ca. 111 (right).

Figure 17. Leaves from 1-2 year old plants of Zacatecas plant no. A6107, 2n = 36 (left); strain no. 109, 2n = 54 (left center); no. 593, 2n = 74 (right center); and autotriploid from no 593 (right).

Figure 18. 6 month old plants of P. incanum, from Alpine, Tex., 2n = 54 (left) and Superior, Ariz., 2n = 72 (right).

MRS. GRIGG, SCADDAN

February 10, 1960

On October 7th, 500 seedlings of six months old from Wembley Research Station were planted. Survival rate was very high, about 75%.

The soil was sandy for 8" to 12" and then clay hardpan. The soil was very dry, rough and lumpy. Looked as if the plants were planted after the ground was plowed and not harrowed or leveled.

The plants were about 3 inches high. The age of the plants were about ten months from seed. Most of the plants had leaf tip burn. The cause of the leaf tip burn was probably the lack of moisture available by the roots because of the hardpan stopping its penetration to the moisture down deep.

Rainfall totals for each month were unavailable. The Agriculture Department at Perth had no record for that section. Only record was the average rainfall, which was 16 inches per year.

Three average sized plants were pulled out to test for rubber content. All three plants were deleafed, chopped up and minced for the sample. It had 6.3% rubber.

ESPERANCE PLAINS RESEARCH STATION

February 10, 1960

Two plantings were made, one on October 1st to 10th and other on December 7th. The October planted seedlings were from Wembly Research Station. The December planted seedlings were from Canarvon and had a crown diameter of ¼" to ½" inch.

The seedlings from Wembly Research Station were six months old but were quite smaller than the seedlings from Canarvon that were five months old.

At Canarvon, the temperature during the growing stages from seed sowing to pricking was much warmer than at Wembly so the Canarvon seedlings grew much larger.

The five months of growing at Canarvon covered the spring months, whereas the six month at Wembly covered fall & winter.

About 10% of the transplants survived. The soil was sandy for about 12" and then clay. The clay was wet and soggy because of the unusual summer rain the day before. The new roots went down as far as the clay.

The December planted seedlings from Canarvon were topped at different height when transplanted but not enough survived to determine the results of this experiment.

Prior to December planting, half of the plot were dressed with zinc, copper and superphosphate and the other half nothing

was added. The seedlings were planted in both half but no significant difference was observed; too early to tell.

In July, 2½ oz of seed were sown direct, but only a very few germinated and were alive.

Esperance Plains Research Station is located about 20 miles from the coast.

Following are the rainfall and temperature just before and after transplanting.

RAINFALL			TEMPERATURE	
		Total	Minimum	Maximum
September	1959	3.23"	38-53	57-73
"	13 & 14 "	2.00"		
October	"	2.68"	38-55	60-83
November		3.94"	41-63	61-100.8
"	22 & 23 "	2.67"		
December		.27	45-60.8	61-95.5
"	3 & 4 "	.27		
January	1960	.68	45-66	61-100.5

Average rainfall per year 17.5"

When asked how the seedlings were planted, the man in charge stated that a round pointed stick was poked into the ground and the root of the seedling was inserted in the hole and soil pressed down at the top. This could leave an air pocket at the bottom of the hole and cause the plant to die.

E. SMART, MINGENEW

February 12, 1960

Test plot located about 30 miles from the coast. 500 seedlings from Wembley Research Station was planted on October 1, 1959. About 20% survived. The man in charge stated that when planting, one half pint of water was given each plant when root was half covered and one half pint more water when planted.

The plants were 2" to 3" high with no leaf tip burn. Good root system with new roots penetrating over 24" deep.

The soil was fine sand running deep; top 12 inches white sand and below that, yellow sand.

This area looked the best suited for growing guayule among the five test plot.

Following are the rainfall totals prior to planting and after:

September	1959	1.20"
October	"	1.65"
November	"	.30"

SALMON GUM

February 10, 1960

This is where the old planting of guayule was growing. It was planted at the start of World War II in 1942.

There were about twenty-five large plants, the tallest was about 15" high. The plants were wider than it was tall. The branches showed evidence of being eaten by xome animal so it could very well have been taller if not eaten. Later at Perth, Mr. Burvill stated that the fence around it was down and the sheeps have been eating it. Only recently, since the interest in guayule have started up again, that the fence was repaired.

There were also naturally reseeded seedlings of different ages around most of the large plants.

We dug up one old plant and found that the roots went down only about 8" and then spread out laterally on top of the hardpan.

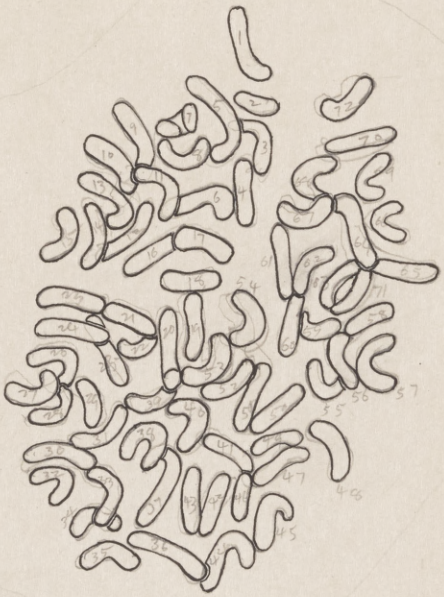
Salmon Gum is about 60 miles from the coast. Average rainfall is 14 inches and have about 5 month growing season. The soil was light red loamy sand.

Check which plants living

Manzanar samples collected by R. Emerson on Thursday, Jan. 20, 1944. Rubber percentage turbidimetric, averages of 5 samples, last season's growth only.

Sample #	Factor	Plant location	Percent rubber
? 1	½ yr. old, III	A I j 39	2.95
? 2	1½ yr. old, III	A I f 14	2.56
? 3	Lopez, A 7301	_____	1.13
4	Lopez, A 7302	_____	1.27
5	sun	A I 1 b 16 = R_9 P_{16}	2.37
6	shade	A II b 19 = R_2 P_{19}	1.11
7	sun	A I 1 b 13 = R_9 P_{13}	1.55
8	shade	A II b 5 = R_2 P_5	1.00
9	sun	A I 1b 12 = R_9 P_{12}	2.05
10	shade	A II b 9 = R_2 P_9	1.14
11	sun	A I 1b. 9 = R_9 P_9	2.40
12	shade	A II b 21 = R_2 P_{21}	1.21
? 13		A 6001-8	2.24
? 14		-7	1.67
? 15	406 done,	-6	1.88
? 16	Parent A 6001	-5	2.15
? 17		-4	3.24
? 18		-3	1.62
? 19		-1	2.06
? 20		A 6002 -1	1.08
? 21	406 done,	-2	1.71
? 22	Parent A 6002	-3	2.25
? 23		-4	1.32

Sample #	Factor	Plant Location	Percent rubber
24	406 done,	- 5	1.61
25	Parent A 6002	- 6	1.8
26		- 7	1.85
27	406 done,	A 6003 - 1	1.97
28	Parent A 6003	- 2	1.92
29	Texas B done,	A 5902 - 1	1.12
30	Parent A 5902, Marathan 3000.	- 2	1.00
31		- 3	1.06
32		A 302 - 1	2.78
33	111 done,	- 2	2.2
34	Parent A 302	-3	2.11
35		- 4	2.58
36	South		2.05
37	North One plant, 420	B II d 24	1.42
38	Center		1.28
39	South		1.60
40	North One plant, 406	B I h 9	1.38
41	Center		1.87
42	South		2.40
43	North One plant, 593	Plot P 3 Plant #2	1.58
44	Center		1.80



72

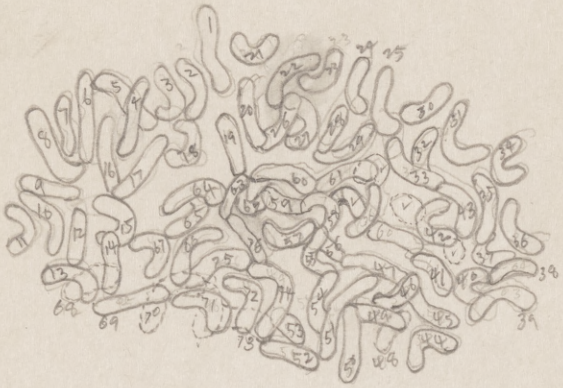
A

305

22

19/89.3

mariola

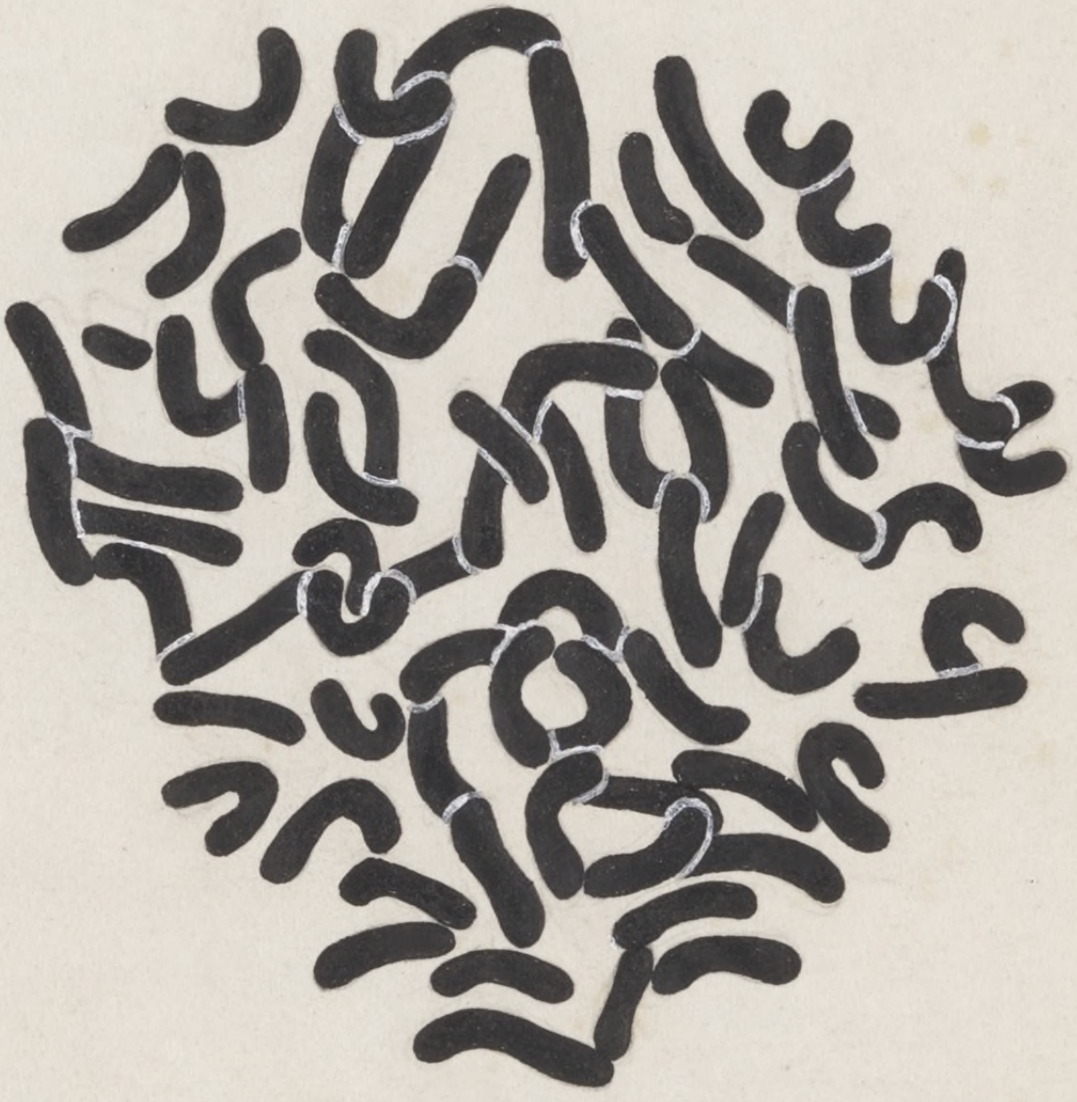


304 Pa. 2
12 8.6/84.9

P. a.
406

3 IV' - 12
30 II' - 60
2 I' - 2
74

MAWZ 3329



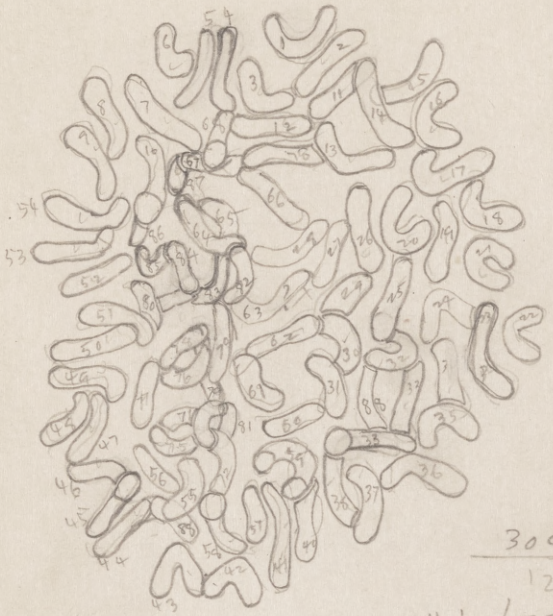
Letterplate, showing both snakes. Fig. 2

P. a.

405
3

74 claro.

MANR 3329



82

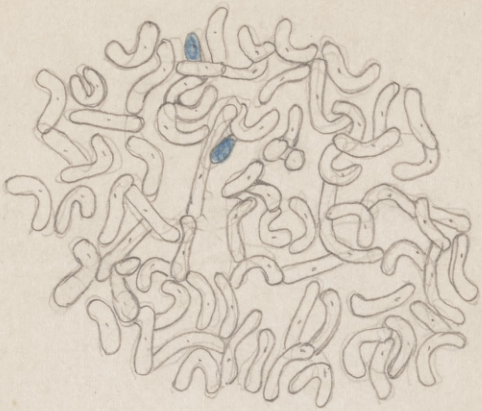
304
12
147/73.1

39
69
70
73
74

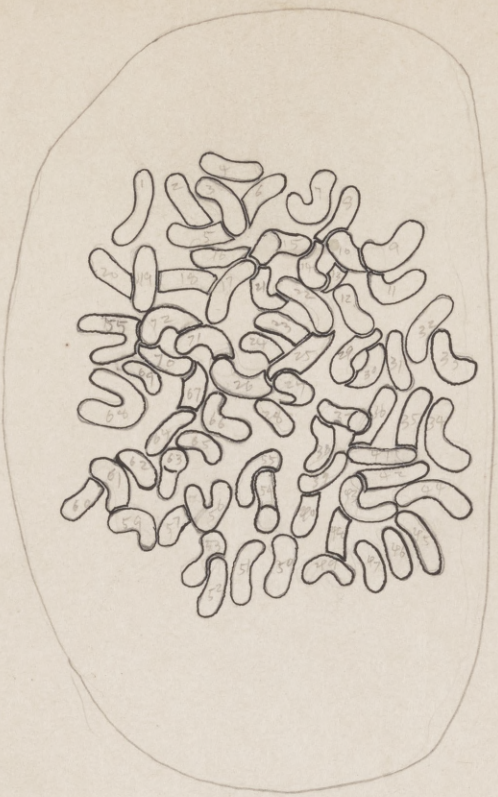
87

416/1 Pa. a. 74 ch.

13.5/95.5



Alb
the microscope



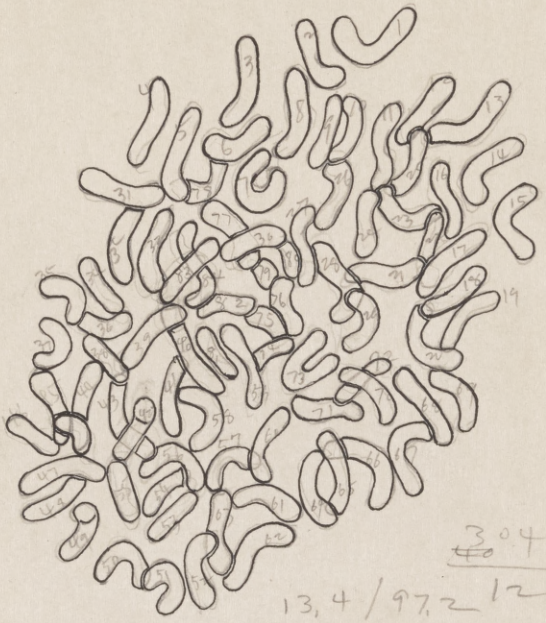
72

Pa i.

303

22

19.3/71.1



84

304

13,4/97,2 12

13,4/97,4

Memorandum from:

HUGH H. ANDERSON

1781

Dear Frank / Jaqueyanne

I haven't heard from you since I was going to get rubber for running through the mill. Do you want to relinquish your plants for this or shall we use those at Pueblo?

Glad to know you are feeling better!

Hugh

ACCOUNTANT STATIONERS & PRINTERS
712 E. Washington Blvd. • Los Angeles 21, California • Phone 749-9241

PACIFIC RUBBER GROWERS
1950 MILL RD.
SO. PASADENA, CALIFORNIA U.S.A. 91030

Frank Kageyama
2349 253rd St
Lomita 90717

Slide #		PDB	Carnoy	Hydrolysis in Acid		Orcein
8	4255 P4 F. P1	1hr 20m.	16 hrs	9:15	9:25	Old
9	"	"	"	"	"	Neu
I N.G. Dark cytoplasm stained, no sep.						
II " " " " " "						
			"	"	"	" few minutes
10	"	"				
N.G. blurry, no separation						
				Neu		Neu
11	"	"	"			
a = orcein few minutes N.G. blurry						
II = N.G. same as 9						
III = " " " "						
12	109 P3 ♀ × 4255 P4 ♂	"	"	9:17	9:27	Old
				"	"	Neu
13	"	"	"			
I N.G. Dark, no sep.						
II " " " "						
			"	"	"	Neu few minutes
14	"	"				
very light, blurry, no separation.						
			"	Neu		Old
15	"	"				
— = 4255 P4 fria		PMC	1hr 20m	48 hrs	Neu	Neu (few minutes)
					"	Carmine (few minutes)
= =	"	"	"	"		

I 4255P4 PMC 1hr 20m PDB 4 Phrs Carnoy Hydrolysis 10 min Orcein (few min.)

II " " " " " " " Carmine (few min)

III " " " " " " " Orcein 22 hrs

mineralized

		PDB	Carnoy	Hydrolysis In	Hydrolysis Out	Orcein
1	4255 P4 F1 P1	1hr	23 hrs	4:18	4:28	
	1 good, dark, separated					
	2 " " "					
	3 fair					
	4 good, separated					
	5 = NG. material					
	6 - pulverized, separated, dark					
	7 - N.G. clumpy, dark					
	8 - N.G. " " , no sep.					
	9 - Fair					
2	109 P3 ♀ × 4255 P4 ♂	1hr	23 hrs	4:19	4:29	
	1 good, separated					
	2 " "					
	3 " "					
	4 " "					
	5 " "					
3	4255 P12	1hr	23 hrs	4:22	4:32	
	1 good, dark, separated					
	2 N.G. dark					
	3 fair					
	4 fair					
	5 poor, faint					
	6 - fair, faint					
	7 - fair					
	8 - "					
	9 - " , few sep					
4	K-1	1hr	2 2 hrs	4:23	4:33	
	1 N.G. material, dark					
	2 " " "					
	3 NG Clumpy					
	4 Poor, few sep.					
	5 Dark, " "					
	6 good.					
	7. NG material, dark					
	8 " "					
	9 fair, few sep.					

4255 P4 5/7

#	PDB	Carnoy	Hydrolysis In	Hydrolysis Out	Orcein
5	1 hr	19 hrs	11:30	11:40	New

1- faint, separated good
2- fair

6	1 hr	19 hrs	"	"	Old

1 - faint, fair
2 - faint, separated
3 - " "

7	1 hr	19 hrs	11:32	11:47	New

1- Too faint.
2- faint, sep.
3 - Very faint, sep.

8	1 hr	19 hrs	"	"	Old

1- fair, faint, sep.
2- N.G. material

9	1 hr 10 m.	19 hrs	11:35	11:45	New

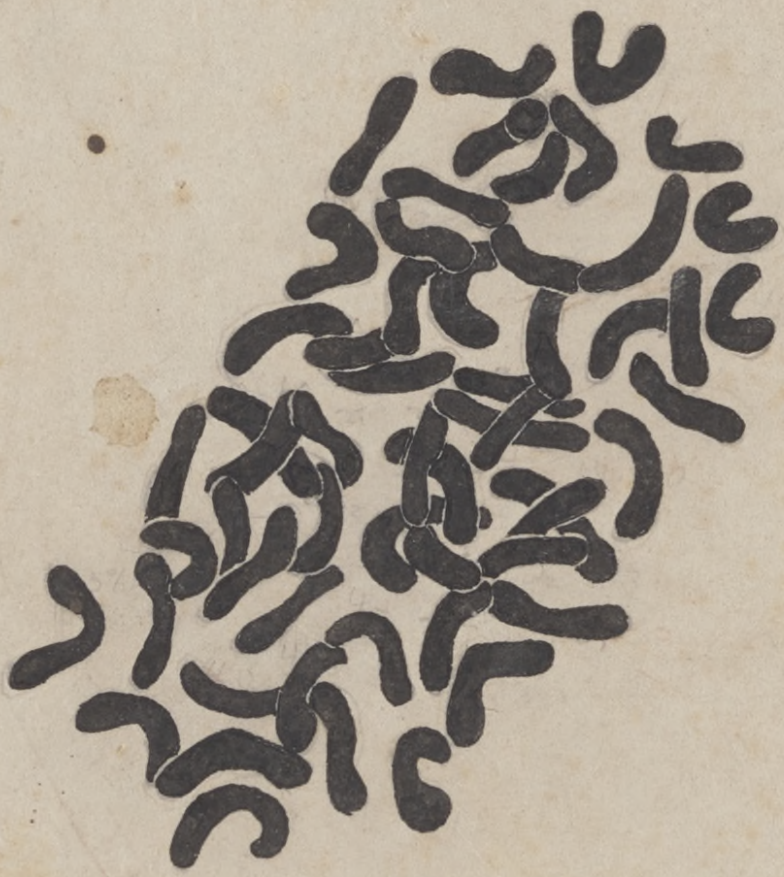
1 good, sep
2 fair, "
3 good "

10	1 hr 10 m.	19 hrs	11:36	11:51	New

1. Chrom. not stained
2 " " "
3 " " "

#		PDB	Carnoy	Hydrolysis In	Hydrolysis Out	Orcein
I	4255 P1	½ hr.	17½ hrs	9:30	9:40	
	I good, no sep. II fair, no sep III Heated IV					
II	"	¾ hr.	17¼ hrs	9:31	9:41	
	I fair, no sep II good, few sep. III Heated IV "		V			
III	"	1 hr	17 hrs	9:33	9:43	
	I II fair, few sep III N.G. IV fair, few sep		V Heated No sep VI No sep VII Heated No sep. VIII No. sep.			IX No mitosis
IV	A 65	1 hr	17 hr	9:34	9:44	
	I N.G. material IV Heated		V Heated few sep. VI VII Heated N.G VIII IX N.G.			
V	R13 P1	1 hr	17 hr	9:36	9:46	
	I fair, few sep II Heated good, few sep III N.G. material		IV Heated few sep. V " Dark, few sep. VI N.G.			
VI	4255 P10	1 hr	17 hr	9:37	9:47	
	I Heated N.G. material II ? fair, not sep. enough III Heated N.G. material		IV Heated No mitosis V dark, one good cell VI Heated N.G. VII N.G. material.			
VII	R13 P1	1 hr	17 hr	9:37	9:47	45% a.a. 2 min 48 hr
	I Heated no sep II no sep III Heated no sep		IV no sep. V Heated — fair, few sep. VI N.G. material			
VIII	4255 P10	1 hr	17 hr	9:36	9:46	45% a.a. 2 min 48 hr
	I Heated N.G. material II No sep. III Heated good, few sep.		No mitosis IV V Heated N.G. material			

54 chromosomes



405/2 19.5/69.5

1a 12.1×18.4 –
12.3×17.7
11.6×17.6
11×17.9

9c 11.1×20.1
10.7×20.8
11.2×21

9b 13.5×15.8
12.8×15

2a 9.8×17.1

2b 14.4×20.5
14.2×19.7
14.4×21.2
12.7×21.2
13×21.3
13.2×21.4
14.2×20.9
14.2×20.8
14.6×20.7
14.7×20.7

3a 12.7×19.8

8b 14.1×21.4
14.3×22

3c 10.4×19.8

2b 11.2×20.2

C-2 11.2×18.7
11.1×18.7 (3)
11×17.6
11.1×18.8

C-3 14.3×17.6
13.9×17.1
13.6×16.8
13.6×17
13.5×17.2
13.4×17.4
13.2×17.6
13×17.1

D-2 12.6×25.8

E-2 13.6×18.5

E-3 13.2×21.9
13.1×16.6
12.8×15.9
12.5×15.2
12.6×15.4

E-4 13.3×22.5
13.5×22.9
13.9×22.4
13.5×22

F-2 12.1×21.8
13–×21.5

F-3 12.1×19.5 anaphase
12–×16.6 ×
11.7×16.6 anaphase

G-2 9.8×16.8 good
9.3×16
9.4×16
10.9×16.3
10.6×14
10×15.9
9.2×16

G-3 11.2×17.8 not good

H-2 10.8×21.5

H-4 11.9×19.9
11.6×18.2
11.9×18–
11.4×18.2
11.2×18.5
10.9×18.7
10×18.6
10.4×18.4
11×18.4
12×18.9

VII-b
13.3×16.2
12.2×16.9
13.3×16–
13.5×16–

VII a
13+×17.9

II-C
11.6×22.1
13.9×21.7
14.1×20.9
14.4×21.8
14.3×21.9
14.1×22.1
14.1×21.6

VII i
13–×21.8
12.9×21.6 X
13.1×21.1
12.7×21.5
12.3×21.7
12.7×21.8

VII-c
13.2×17.5
13×17.8
12.7×17.5 X
12.2×19.2 X
11.9×17.2
11.5×17.1
11.7×17

VII d
10.2×16.7
10.4×17.3
11.1×17.4

5 II b 12.1×18.4
12.3×19
11.8×19
12.7×20.4
12.8×18.8
13×20
12.2×20

1-I 13.2×18.6

2-I
11.3×18.9
12.9×16.8
12.6×16.7
12.5×15.2
11.9×18.2
11.9×18
11.9×16
11.5×17.7
11.5×15.9
11.6×15.6
11.3×17.8
11.2×16.9
10.7×17.6
10.8×16.1
10.5×16.4

5 II a
10.6×19.3
10.9×19.3
11.4×18.6
11.1×19.5 X
11–×18.9
11×19
10.4×18.7
10.5×20.1
10.5×20.4
10.3×21.1
10.4×20.1
9.5×19.2

2-II 11×19.5
12.8×20
11.1×19.7
11.1×19.9 (3)
11.6×20.7
11.9×20 XX
11.1×19.2

2-III
12.9×20.4
12.3×20.3 X (2)
12.2×20.2
12.2×20.3
12.1×20.1
12+×20
11.9×20.1
11.8×20
12×20.2 (double)

3 III
14.4×19

4 II a 11.2×20.8

4 II b 11.4×19.1
11.5×19
11.4×18.7
11.2×18.6

2-2
10.4×19.1 X
10×20–
10×19.6 XX
10.1×19.5
9.8×19.6
2-8
9.1×20.7
9.7×20.1

9-3
13.4×21 X
14×22.5
13.7×22.1
13.9×22
14×22
13.8×22.4
14×22.2
13.5×21.8
13.2×22.2
13.6×20.4
9-3b
12.2×17.6

9-2
9.2×20.7 X
9.2×20.6
9.6×20.5

3-6
13.7×20.5
13.7×19.3
14×19
13.9×19.3
13.6×19.5
13.7×18.4
13.2×18–
14.2×18.3 X
14.4×18.6
14.9×19+ (3)
14.9×18.8
14.2×18.6
14.1×18.6 (2)
14.1×18.7 X

3-7
12.6×21.3
12.8×20.9
12.9×20.3

2-4
15.8×22.6 XX
13.2×22–
12.2×20.9
11.7×21.6 X
2-5
10.6×20.7

4-6
10.9×17
11.6×19–
11.6×18.9
11.7×19–
10.5×16.9

4-9
14×18
13.4×17.7

IV-IV

12.1×20.7

V-V

10.8×21.1
10.7×22.2

VI-V

12.9×18.8
14.5×19.1
14×18.5×

MAUZ 3329

4255 P4 4/29

	PDB	Carnoy	Hydrolysis		Orcein
			2	0	old
1	1 hr	24 hrs	4:45	4:55	

I good, separated
II fair, few mitosis sep.

2 1 hr 15 min 24 hrs 4:46 4:56 old

I good, separated
II " "
III " "

3 1 hr 30 min 24 hrs 4:50 5:00 old

I dark, no sep.
II good, few sep.
III fair, very few sep.

4 Same as #1 except Neu Orcein

a = Orcein 16 hrs good, separated
II good, separated

5 Same as #2 except Neu Orcein

I = Orcein 16 hrs dark, separated
II = very good, separated

6 Same as #3 except Neu Orcein

a = Orcein 16 hrs good, few separation
II dark, very few mitosis
III N.G.

7 Same as #1 except No hydrolysis Orcein 16 hrs
Very light, separated

5/21	PDB	Carnoy	Hydrolysis	Orcein 5/22
1	1 hr	19 hrs	10 min	12:00 noon
2	17 hrs	24 hrs (old)	10 min	5/23 9:30
3	17 hrs	24 hrs new	10 min	5/23 9:30

5/28 4:15 Rm. 10% HCl Orcein

	Vial Nr	PDB	Carnoy	In	Out	
1	I	1 hr	18 hrs	10:16	10:26 = 10 min	10-1× 12.4×22.5 12×22.5 11+×21.2 8.4×19.1
2	II	1 hrs	18 hrs	11:18	11:31 = 13 min	
3	III	1 hr	18 hrs	11:20	11:35 = 15 min	
4	I	2½ hrs	16½ hrs	10:40	10:50 = 10 min	
5	II	"	"	10:42	10:55 = 13 min	
6	III	"	"	10:44	10:59 = 15 min	
7	I	3 hrs	16 hrs	10:40	10:50 = 10 min	12.5
8	II	"	"	10:42	10:55 = 13 min	
9	III	"	"	10:44	10:59 = 15 min	
10	I	4 hrs	15 hrs	10:40	10:50 = 10 min	
11	II	"	"	10:42	10:55 = 13 min	
12	III	"	"	10:44	10:59 = 15	
13			19 hrs	11:24	11:34 = 10 min	
14			19 hrs	11:24	11:37	
15			19 hrs	11:24	11:39	

			PDB	Carnoy	Orcein
I	I	V 7E 4m	4 hrs	12 hrs	
II	I	"	4 hrs 10 min	12 hrs	
III	I	"	4 hrs 20 min	12 hrs	
IV	II	X 9A 2m	4 hrs	12 hrs	
V	II	"	4 hrs 10 min	12 hrs	
VI	II	"	4 hrs 20 min	12 hrs	

6/2/46

		PDB	Carnoy	Hydrolysis In	Hydrolysis Out	Orcein
I	④ Zn	4 hrs	16 hrs	11:30	11:40	11:51
II	"	4½ hrs	16 hrs	11:30	11:40	
III	"	4½ hrs	15½ hrs	11:30	11:40	
IV	"	4¾ hrs	15 hrs	11:30	11:40	
V	VI-E	4 hrs	16 hrs	11:32	11:42	11:53
VI	"	4¼ hrs	16 hrs	11:32	11:42	
VII	"	4½ hrs	15½ hrs	11:32	11:42	
VIII	Tot	4 hrs	16 hrs	11:35	11:45	11:55
IX	"	4¼ hrs	16 hrs	11:35	11:45	
X	"	4½ hrs	16 hrs	11:35	11:45	

No Mitosis

Slide No.	Type No.	Time in PDB	Fixing agent	Time in Fixing agent	Hydrolysis 10% HCl in	out
1	4255 P1	1¾ hrs	65% aa.	22¼ hrs	10:30	10:40
	a- good, few mitosis, no separation		b- light, few mitosis, no separation			
2	4255 P1	1¾ hrs	carnoy	22¼ hrs	10:31	10:41
	a- perfect, no separation		b good, no separation			
3	4255 P4	1¾ hrs	65% aa.	22¼ hrs	10:34	10:44
	a, good, no separation		b same as a			
4	4255 P4.	1¾ hrs	carnoy	22¼ hrs	10:35	10:45
	a good, no sep.		b. dark			
5	4255 P1	2 hrs	65% aa.	22¼ hrs	10:43	10:53
	a. very dark		b dark			
6	4255 P4	2 hrs	carnoy	22¼ hrs	10:44	10:54
	a n.g. material		b. good, no separation			
7	4255 P4	2 hrs	65% aa.	22¼ hrs	10:50	11:00
	a. n.g. material		b N.g. material	c. N.g. material		
8	4255 P1	2 hrs	carnoy	22¼ hrs	10:56	11:06
	a. Perfect, no separation		b perfect, no separation			
9	4255 P1	2¼ hrs	65% aa.	22¼ hrs	11:00	11:10
	a. good, no sep.		b light, no sep.			
10	4255 P1	2¼ hrs	carnoy	22¼ hrs	11:01	11:11
	a, good, no sep		b, fair, no sep, N.g. material	c. good, no sep.		
11	4255 P4	2¼ hrs	65% aa.	22¼ hrs	11:04	11:14
	a. n.g. material		b- good no sep.			
12	4255 P4	2¼ hrs	carnoy	22¼ hrs	11:05	11:15
	a. not clear, no sep		b. good no sep			

4/10/46

Slide No.	Type No	Time Picked	Time in PDB	Time in Carnoy	Hydrolysis HCl 10% in	Hydrolysis HCl 10% out	Time in Orcein
1	4255 P4	4:10 pm	2½ hrs	15 hrs	9:26	9:36	
	a good, separated?	b fair, no mitosis	c fair, no mitosis	d fair			
2	4255 P4	4:10 pm	3 hrs	14 hrs	9:11	9:21	
	a. fair, separated?	b. good, separated?					
3	4255 P4	4:10 pm	4 hrs	13 hrs	9:14	9:24	
	a good	b good	c. good, separated?	d good, no separation			
4	4255 P12	4:20 pm	2½ hrs	14½ hrs	9:25	9:35	
	a poor, no mitosis	b poor, no mitosis	c. fair, separated?				
5	4255 P12	4:20 pm	3 hrs	14½ hrs	9:55	10:05	
	a fair, light	b light, no mitosis	c fair, separated?				
6	4255 P4	4:10 pm	3 hrs	17 hrs	12:10	12:20	
	a. fair, separated?	b good separated?	c fair, no mitosis				
7	4255 P4	4:10 pm	3 hrs	17 hrs	12:10	12:25 = 15 min	
	a M.g.	b too light	c too light				
8	4255 P4	4:10 pm	4 hrs.	16 hrs	12:11	12:21	
	a too light	b fair, separated?	c fair, light				
9	4255 P4	4:10 pm	2½ hrs	14½ hrs	No		
	a light	b good, separated?	c good				

4/15/46 Allare 4255 P1

Slide #	Time in PDB 3:00pm.	Time in Carnoy	Hydrolysis In	Hydrolysis Out	Time in Orcein
A	2 hrs	16 hrs	9:15	9:25	
	1. fair, mitosis (#1 NG pried off)	2 fair, mitosis (#2 NG)			
B	4 hrs	14 hrs	9:16	9:26	
	1. fair, mitosis (#1 pried off NG)	2 fair, no separation	3. fair, mitosis (#2 NG)	4, good (#5	
C	5 hrs	13 hrs	9:19	9:29	
	1. good, mitosis (#1 cover glass off by itself NG)	2. good, mitosis (#3 good, light	3 good, mitosis (#4 dark, good.		
D	2 hrs	22 hrs	3:00	3:10	
	1. good, mitosis (#1 cover glass off by itself)	2, faint milky (#3 light	3, light (#4 NG		
E	4 hrs	20 hrs	3:01	3:11	
	1. fair (#1)	2, good (#3 fair)	3, good (#4 good)	4, good (#5 good)	
F	5 hrs	19 hrs	3:04	3:14	
	1. good (#1, cover came off by itself)	2 blurry (#3	3. good (#4		
G	2 hrs	16 hrs		No	
	1. good, light (#1 pried off)	2. good, light (#3	3. good (#4	4 good (#5	
H	4 hrs	14 hrs		No	
	1. N.G.	2. fair (#3 NG)	3 N.G.	4 good (#5	5 good (#1)

(#1) Absolute alcohol
(#2) Meyers
(#3) Meyers + Xylene
(#4) Kodani method
(#5) Meyers with canada balsam

4/2

Slide	Type	Hours in POB	Hours in carmoy	HCl In	HCl Out
1	4255 P1	1½	17	9:00	9:10
a (stained good)	b+c Stained good, light. No separation				
2	4255 P4	1½	17	9:03	9:13
a (stained good)	b+c Perfect, no separation				
3	4255 P1	2¼	17	9:45	9:55
a (stained light)	b. Fair, dark	c dark, N.G.	d fair		
4	4255 P4	2¼	17	9:48	9:58
a (blurry) b, c + d good, no separation		d. not clear, separated? b not clear.			
5	4255 P1	2½	17	10:00	10:10
a (dark)	b dark	c very dark			
6	4255 P4	2½	17	10:03	10:13
a (stained good, not spread)	b stained very dark	c fair, no separation			
7	4255 P1	3	17	10:30	10:40
a (stained good, no mitosis)	b dark	c. dark			
8	4255 P4	3	17	10:33	10:43
a (no mitosis)	b fair, dark	c fair, dark			
9	4255 P1	3	15½	no	
a (stained dark)	b not clear				
10	4255 P4	3	15½	no	
a (dark)	b not clear				
11	4255 P1	2¼	16¾	no	
a (dark, poor)	b. not clear, separated. X				
12	4255 P4	2¼	16¾	no	
a (poor)	b not clear.				
13					
14					
15					

Chromosome no.	Location	Variety	
V14	† AI f31	Texas #3 A5802 (analysed 4.1%)	No Seed
V " ?	† BII R11P11	406 MS	No seed
V74?	DII R16 P57	427 MS	Seed
V14?	† BI R6 P20	Texas A	Few Seed
36 V	† AI f31 ~~A 405~~	Mexico A6115	seed
" V	† AI e43	" A6114	No "
" ?6	† BII R12 P1	Mexico	Few Seed
~~?2n74~~	~~† AI d6~~	~~405 A5005~~	~~No "~~
~~"~~	~~† AI e5~~	~~49 A1002~~	~~No "~~
" V	† AI e9	Durango A	No "
54? V	† BII R17 P52	109 P1	Few Seed
~~54?~~	~~† BII R17 P53~~	~~109 P3~~	~~No Seed~~
54? V	† BII R17 P54	109 P3	" "
58?	† BI R9 P6	111	Few Seed
~~58?~~	~~BII R20 P1~~	~~111~~	~~" "~~
~~58?~~	BII R20 P3	111	" "
58?	BI R10 P1	111 (Hybrid?)	Seed

Chromo no.	Location	Variety	
108?	BII R11 P27	406	No Seed
~~108?~~	~~BII R14 P33~~	~~406~~	~~No Seed~~
108?	BII R16 P59	459	Seed
~~?~~	~~BII R17 P1~~	~~49?~~	~~Few Seed~~
	~~(Plant Very Large, No Die Back)~~		
?	BII R14 P52	Merida Type	Few Seed
?	BII R17 P31	430 (analyzed 3.9%)	No Seed
?	BII R17 P28	150 (analyzed 3.2%)	Few Seed

Stick 5/9
#16 Texas A
17 " B
18 " C
19 " F

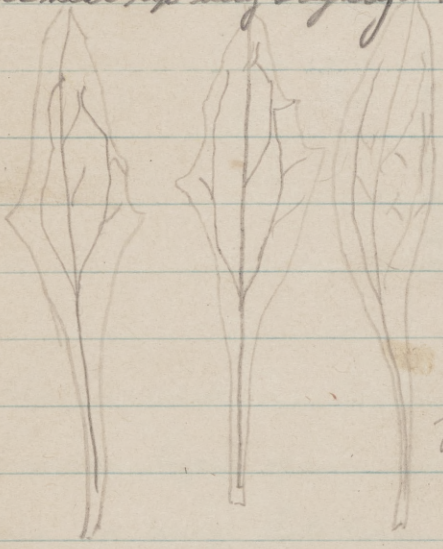
14 5/10 109 Seed 5/18 43,000 seedlings
10 130
13 Mexico #25

#1 R14 P52 5/15 treated
2 R20 P3 5/18 sowed
3 A6115
4 Mexico R18 P1
5 109 P1
6 111 R9 P6
7 R10 P1

6
24
9
216
1200
43,200

Texas C R1 P3

Leaf hairs smooth running in one direction
Under side
leaves near tip very slightly lobed, long and narrow.



length			
		4.2	3.7
		3.0	3.5
4.0	3.9	3.6	3.2
4.2	3.5	3.6	3.6
4.5	3.4	3.9	3.3
4.7	4.1	4.3	3.2
4.6		4.0	
4.1		3.5	
4.6		3.3	

Thickness leaf 4.4 3.7
5.5

young leaf
2.9 3.8
3.3
2.7
3.5
3.4
2.9

1.3 l	1.2+
1.1 w	1.1+
1.1+l	1.2+
	1.1
1.2	1.2+
1.2	1.2+
1.3	1.2+
1.2	
1.2	

Stamata

	.4.5 l .55 l .45 w
.5 l	.4 w
.4 w	
.5 l	.5 l
.4 w	.4 w.
	.5 l
1.2 +	.4 w.
1.3 +	.5 l
1.3 -	.4 w
1.2	
1.3	4l
1.4	4w.
1.3	

corolla is longer than wide on older flower. Stamen do not open wide.

Texas E R.P.S

Stomata

Leaf hair

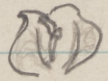
4.5	4.3	3.2
4.1	4.2	3.3
3.6		3.4
4.1		4.2
		4.4
		4.5
		4.1

.4 l	1.1+ l
	1.1- l
.3.5	
	1+ l
.45 l	1.2
.4 ~	1
	1+
.4 l	1.1
.4- ~	1.1
	1+
4+ l	
3.5 ~	1+ 1
	1- 1-
4.5 l	1+ 1.1+
3.5 ~	1+ 1
4+ l	1+ 1.1
3+ ~	1.1

Corolla is wide as is long

Stamen lips open more than C ⊤

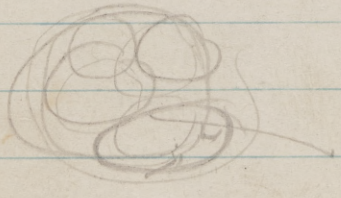
Leaves are more lobed near tip also more veined, also wider



Tcres 13

stomata

1.1	1.2	1.2
1.2	1.2	1.2
1.3	1.2	1.1+
1.2	1.2	1.3
1.3	1.2+	1.2
1.1+	1.2	
1.2		



16 | 3
.06
96.78

6.15
10.97
8.58
+ 7.20
32.70

2.70
9.81
5.34
3.00
4.20
5.25
4.74
+ 8.00
13.50
3.30
546.0
73.04

109 3/4

5125
1.12
10250
5125
6.1500

4|12479
10975

85 3/4
4 | 343
4|280
2 2 2
4|90

85.75
8 1 3/4
4|327

8177
12
16350
8175
98100

4|1375
12 225
450
2700

4|178|445
12
890
445
5340

4|95|4375
8750
4375
2500

25
12
50
25

35
4|140
35
12
70
35
20
4|140

4|558|375
12
90
75
3 4 140
4

606
66|43,560
396
3960

~~Gift~~ ~~Sisters~~

~~Xmas Cards~~

~~Hotel~~

1 J. Miyamoto — 19 Rankin —
2 Dr. Emerson — 20 Smith —
3 K. Senzaki 2335 Dwight Way 21 Jones —
4 J. " — 22 T. Kawahara —
5 S. Mune — 23 Dr. Murakami —
6 Nellie Thomas — 24 McCallah —
7 C. Sandy — 25 Jones —
8 R.O. Keen — 26 Burt —
9 Kohrer — 27 Henderson —
10 Snyder — 28 Stevens —
11 T. Brin — 29 Woodworth —
12-13 Sparti —
14 Elder —
15 Shipping —
16 Hilger —
17 Porter —
18 Thomas —

3 15

197 | 3.00
197
1030
985
45

1g = 12

99 | 3.00
291

2g -

Row #1 - 2g of 406 { 1g of it 1½ % - 2 hrs.
1g of it 3% - 2 hrs.

Row 4 - 2g untreated
Row 3 - Same as Row 1 - seeds crushed
Row 2 - " " " " presprouted

2 - 2g
12 - 1g

Row	1a – #5	1b – #6
"	2a – #2	2b – #1
"	3a – #7	3b – #8
"	4a – #14	4b – #13
"	5a – untreated	5b – 16
"	6a – #9	6b – #10
"	7a – #12-2	7b – #11-1
"	8a – #3	8b – #4
"	9a – #15	9b – untreated

Stick #1 403 seeds 1g 1½% 4hrs. – Row 2
" #2 396 seeds 3g % " " " " 2/11
Stick #3 " 1½% 4hrs " 8
" #4 " 3% " " " 8
" #5 3g % 2½ + 1½ crushed Row 3
" #5 1½% 2½ " " " "
" #7 1½% 2½ hrs " Row 1
" #8 3% 4½ " Row 1
" #9 3g % 2½ hrs crushed Row 7
" #10 1½% 4hrs " " "
" #12-2 3g % 4½ " Row 5
" #11-1 1½% " " " 6
#3 3g 1½% 4½ hrs " – 50 – 50 3/25-77
#4 3g 3% 4½ " – 50 – 50 3/25-30
#11 3g 1½% 4hrs crushed 3/25-42
#12 3g 3% " " crushed 3/25-0
#13 1g 1½% pressed "
#14 1g 3% " "
15 1g 1½% " "
16 1g 1½% " "
5% 2hrs 3/25 – 121
uncrushed 3/25 – 75

10% | 12 2/5%
5 | 50 | 5 | 612

8%
12
13
15
8
2
5 | 56
11%

#13	10% – 6%	
15	8% – 16%	
1½% 17	16% – 10%	
19	8% – 22%	
3	8% – 8%	
14	12% – 10%	11
16	12% – 20%	16
3% 18	16% – 16%	16
20	10% – 4%	7
4	4% – 14%	9
		2
		5 | 59
		12%

5 | 54 | 5 | 64
11% | 13%

#13	406 shelled	1½%	2 hrs	3/1 - Treated 3/7 - 2-2-1 - 10%
14	" shelled	3%	2 hrs	3/7 - 1-3-1-1 - 12%
15	" shelled	1½%	4 hrs	3/6 - 1-1-2 - 8%
16	" shelled	3%	4 hrs	3/7 - 2-1-2-1 - 12%
17	"	1½%	2 hrs	3/11 - 2-3-1-1-1 - 16%
18	"	3%	2 hrs	3/6 - 2-3-2-1 - 16%
19	"	1½%	4 hrs	3/7 - 1-2-1 - 8%
20	"	3%	4 hrs	3/6 - 1-1-1-1-1 - 10%
	#3			3/10 - 1-1-1-1 - 8%
3/7	#4			3/13 - 2 - 4%
#13₂ - 3			3½ hrs.	3/13 - 1-1-1 - 6%
#14₂ - 2				3/11 - 2-1-1-1 - 10%
#15₂ - 2				3/11 - 1-2-3-2 - 16%
#16₂				3/11 - 1-6-1-3 - 20%
#17₂				3/13 - 2-1-2 - 10%
#18₂				3/11 - 1-2-4-1 - 16%
#19₂				3/12 - 4-5-2 - 22%
#20₂				3/15 - 1-1 - 4%
#3₂ - 5 ends			4 hrs.	3/11 - 1-1-2 - 8%
#4₂ - 3			4 hrs.	3/11 - 2-2-3 - 14%

x - Root tip - Dark

3/23 Treated + sowed

#13 50 seeds shelled 2½ % 2 hrs. 3/27-8-4-2-1

#14 50 seeds " ordered 2½ % 2 hrs. 3/25-2-4

~~50 seeds 2½ % 2 hrs.~~

#17 50 seeds shelled 2½ % ½ hrs 3/25-2-4-1-3

#19 50 seeds " 1% 2 hrs 3/25-1-1-1-1

20 50 seeds 1% 4 hrs 3/27-1-1-2

#1 50 3/22 Treated 3/23 sowed 2½ % 4 hrs 3/23-1-2

#2 50 2½ % 2 hrs 3/25-4-3-1

#3 50 2½ % 2 hrs 2nd Treat 3/27-1-2-1-2

#6 ✓ 29 4/5 #11 - 427 ✓ 4/6 3%.

#10 ✓ 30 4/5 2 - T#4 ✓ 4/5

5 ✓ 24 4/5 12 - 428 ✓ 14% 4/5

✓ T#3 - 4/6 18 = T#2 ✓ 14%. 4/6 3%

5 = T#5 ✓ 31%. 4/6

7 = 593 4/6 3%.

17 = 111 4/6

Stick

#1 T#1 900 seeds

#2 T#2 1400 seeds

#3 T#3 800 seeds

#4 29 875 seeds

#5 30 1150 seeds

#6 T#3 (1942) 700 seeds

#7 T#2 (42) 600 seeds

~~#8 Salinas Marriota Type 8.1g~~

406 12g

406 #8 4004370

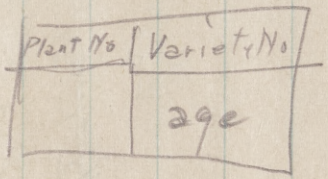
T Alive to tip

+ " " half

+ Alive to just above surface

× Dead

Age a ?pod moved ?



R 1 2 > 4 Same till P55

R2 Same

R2 P1 – P47 406F

48 – 52 = 0 H11P5 P6 54 – 55 same as R1 P54-55

H4P2 H5P4
P56 – 57 = further apart 58 – 59 = 0

H13P1
P60 = Between R1 P61+62

R3 Same as R1

R4 P1-26 405 sm P27 = 0 P28 – 39 = 415 sm

P40 = 0 P41 one Same as R1+3

R5 P1-49 Same as R1+3+4 49 on = 0

R6 P1-20 428 Same P21 = 0 P22-45 = 427

P46-56 = ? P57-427 P58-407 P59 = 457

P60 = H11P8 rest 0 Same as R1

R7 P1-P26 = 449 P27 = 0 P28-56 = 130 ms P51-52 = 0

P53-57 = 109 P58 = Int. R6 P57+59 P59 = R6 P60

P60 = H11P9

R8 P1 P2 = 0 P3+4 P5 on 0 till 33 P34-49 on = 0

R9

Rx O-8-24-29

How to plant
Stevia

1

MANZ 3329

I #2 New material in 45% Acetic-Orcein 10:00 (no good)

II #3 Old material orcein ~~10:11~~ 20 min (prophase light)

III #1a Old material - put in acetic 45% for one hour stained with orcein ~~#307~~ 10 min. (good material stain light)

IV #1a old material put in acetic 45% for one hour stained with orcein 11:12 (No good)

V #1 old material in alc 75% orcein 11:17 (Too late stage - stained yellow grain good.)

VI # New fresh material - not killed - orcein 12:10 - 5 (Too light N.G.)

VII #1 Old material orcein 12:13 30 — (too light)

IX Fresh material not killed - carmine 11:02 stained well material (Prophase)

VIII Fresh " killed 1hr - orcein 11:06 "

X " " " " carmine 11:16 (Stained well material N.G.)

XI #2 Old material orcein 11:21 (Too light N.G.)

#1 12 × 17.6

#5-1 10.8 × 18.2

#5-2 12.5 × 17.5
12 × 18.7 ×
11.8 × 18

K-C II
6.5 × 18.6
6.3 × 18.8
6.3 × 19
6.5 × 18.1
6.6 × 18.6

12.4 × 20.2
12 × 19.3

12.8 × 22.1

~~11.4 × 12.3~~

11.7 × 12.5 ✓
11.8 × 12.5 good
11.2 × 13 "
11.7 × 11.8 ✓
11.5 × 13.7 ? ✓
11+ ✓ 12.1 ×
11.3 × 13 -
12.3 × 12.6 good "

~~19.4 × 15.0~~

19.4 × 15.6

~~10~~

19.3 × 15.4

19.4 × 15.0

19.2 × 15.1

19.3 × 15.2

19.4 × 15.1

MANZ 3329

a #3 Old material Carmine ~~11:15~~ 10 min (Dark Tetrads)

b #3 " " Orcein 11:19 6 min (Too light)

c #3 " " " 11:34 15 min (Too light)

d " " " Carmine 11:37 - 4 min (good pollen stage)

e " " " " 12:57 - 5 min (good Tetrad)

f New material Orcein ~~1:11~~ 15 min (light Too early stage)

g " " carmine ~~1:14~~ 15 min (dark Too early)

h #3 put in 45% acetic 1 hr Orcein ~~1:22~~ 15 min (light Tetrads)

i #3 " " " " " ~~Orcein~~ ~~1:43~~ 15 min (light Tetrads)

j #1 Old material Carmine ~~2:11~~ 7 min (good Too early)

k " " " " ~~2:13~~ 4 min (good Tetrads)

l New HIO_3 + 45% acetic 1 hr Orcein ~~2:21~~ 15 min (

m #1 old material Carmine ~~2:15~~ 4 min (good Too early)

n_1 #1 " " Orcein 2:43

n_2 2:50 3 2:55 4 2:59 5 3:45

6 - 3:55 7 - 11:09 8 - 11:13 9 - 11:16 10 - 11:20 11 - 11:25

O_1 #1 old material Carmine 3:48

O_2 " " " " 4:22 O_3 4:26

n_{30} 4:35

Slide #1

19.6 × 16.3

D
10.5 × 19.5
12.7 × 19.4
12.2 × 18.8
10.3 × 19.2

C
14 × 24.6
13.5 × 27.1 ✓
13.5 × 26.3 ✓
13.6 × 25.8 ✓
13.7+ × 25 ✓
12.5- × 24.4+ ✓
12.6 × 26 ✓
12.3 × 26.4 ✓
12.3 × 24.3+ ✓
12.3 × 23.9 ✓

12.2+ × 22.8 ✓
12 × 24.4 ✓
11.8 × 23.7 ✓
10.7 × 24.4 ✓

A65 Slide # 1 133 × 24.8

P4

15.5 × 21.8

✓16 × 21 good?

✓16.3 × 19.7

✓16.4 × 20 (Equatorial

✓16.2 × 21.3 ×

✓16.5 × 21.5

✓16.7 × 20.3

✓16.8 × 21.9-

✓16.8 × 21.9+ ×

✓17.1 × 20

✓17.2 × 20 ×

✓17.4 × 20 ××

✓17.5 × 21.2 ?

✓17.6 × 19.9+ ×

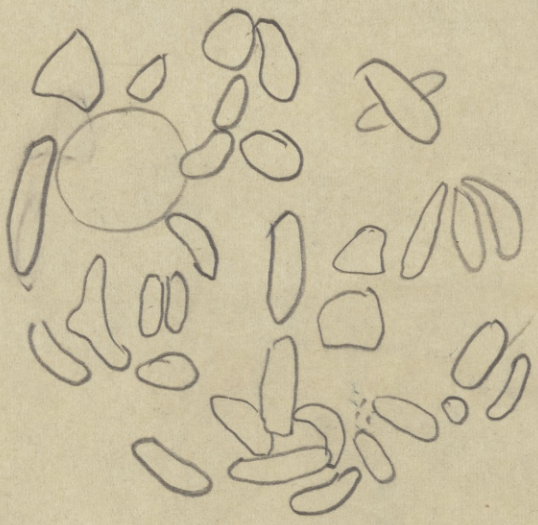
17.

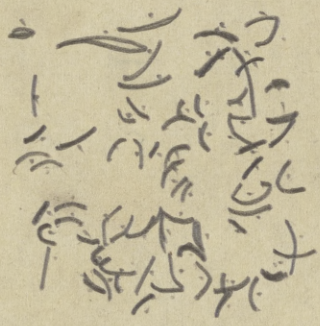
Kc

15.8 × 19.3

14.4 × 22.5

MANZ 3329





70

Tex D P2 Slide #1

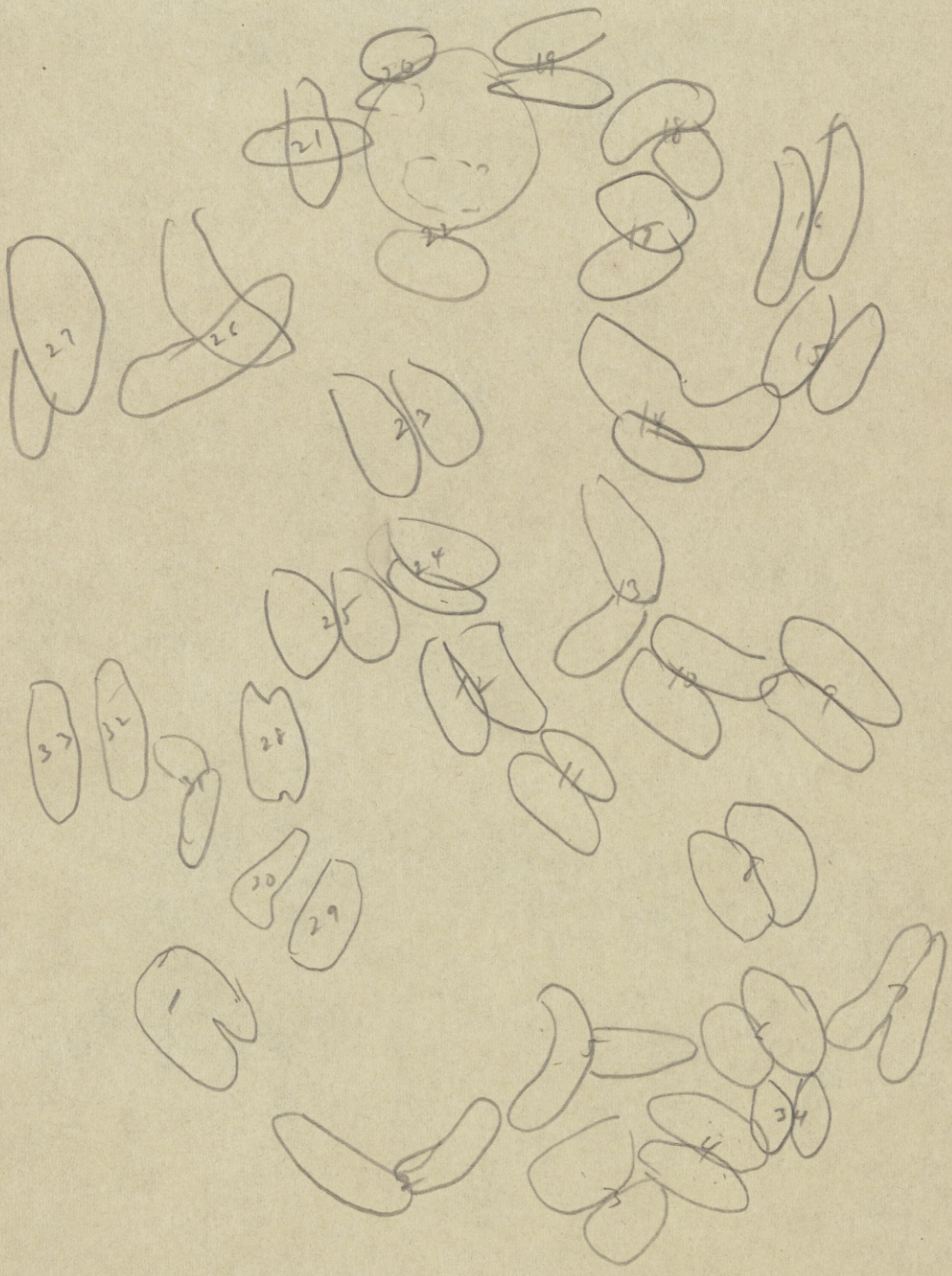
Slide #				
1	colchicine treated	(new carmine)	(late (yellow))	Vial 2
2	" "	(" ")	(early)	Vial 2
3	4255 P_3	(old carmine)	(late (tetrads))	Vial 1
4	" "	(new ")	Early	Vial 4
5	col	(" ")	(late)	" 2
6	4255 P_3	(" ")	Early	" 4
7	col	" "	(Early	" 2

ca 28

x2 56

K-C #1

13 x 19



14.8X19.6

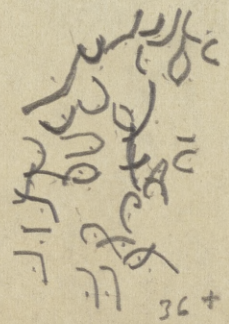
8X11.4
1.9X17.8 ~~14.8X21.4~~

Why Don't You turn
off Light when you
leave?

Nakamura

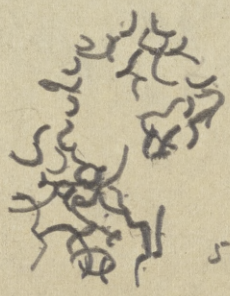
10/23/45

12.5 x 22.1



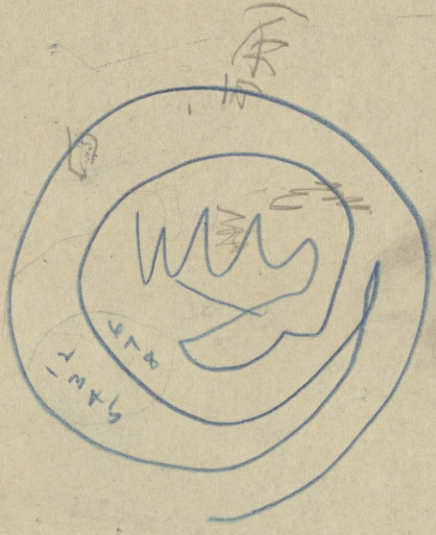
36+

42 5/ P1 S#2

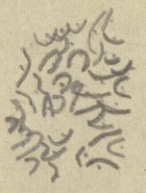


58±

III S#1 11.2×16.7



13×17.5



4255 P1 St 3

3750

3591

3509

3426

3750
3426
324

1700
3400

400
324
76

1753
3509

3500
100
60

8000

10,000
5

7000

40
45

in 11:12 out 11:22 10min HCl

#1 — 4255 P5 (1hr PDB 23hr 30min carnoy (Stained OK.)

#2 — A65 1hr 20min PDB 23hr carnoy 10min HCl
in 11:15 out 11:25 (Stained OK)

#3 — A65 1hr 20min PDB 23hr carnoy 30min HCl
in 11:14 out 11:44 (Not stained

#4 — A65 2hr 45min PDB 21hr 40min carnoy 10min HCl
in 11:19 out 11:29 (Stained very light)

#5 — A65 2hr 45min PDB 21hr 40min carnoy 30min HCl
in 11:18 out 11:48 (Same as #7+9

#6 — 4255 P4 1hr 15min PDB 23hr carnoy 10min HCl
in 11:22 out 11:32 (Slide a - Stained OK.
Slide b - Stained too light)

#7 — 4255 P4 1hr 45min PDB 23hr carnoy 30min HCl
— 11:21 out 11:51 (Same as #4)

#8 — 4255 P4 2hr 40min PDB 23hr. 30min carnoy 10min HCl
(Stained O.K. but no good cells)
in 11:25 out 11:35

#9 — 4255 P4 2hr 40min PDB 23hr 30min carnoy 30min HCl
in 11:24 out 11:54 (Chromosomes stained probably too much hydrolisis.)

Slide #6 & 8 made permanent by Meyer method
#1 & 8 " " " 100% alcohol - xylene

MANZ 3329

No.	Type	Hours in PDB	Hours in Carnoy	HCl In	HCl Out	Time in HCl	Orcein
1	Marsila	2	17	No	—	9:30	a-24 hrs b-72 hrs
	a+b (Chromo not stained)						
2	"	"	"	10:10	10:15	5 min	11:15 a-24 hrs
	a (N.G.) b- (mitosis separated, not stained well)			10:10	10:25	15 min	a-12 hrs
3	"	"	"			b-1 N.B material	
	a (stained light, very few good cells)					b-2 very good mitosis, separated	a-12 hrs
4	"	4	15	No			
	(a-1 - stained good, few very good cells)			b-1 stained dark		b-2 stained good	
	a-2 -						a-12 hrs
	a-3 -			10:12	10:17	5 min	
5	"	"	"				
	a (Very few good cells, stained OK)			b. stained dark			
				10:13	10:28	15 min	a-12 hrs
6	"	"	"				
	(a-1 + a-2 - Stained OK Few good cells)			(b stained dark)			a-12 hrs
7	109 P1	2	17	No			
	a (Chromo not stained)			c (Not stained right)			
8	"	"	"	10:22	10:32	10 min	a-12 hrs
	a (Stained OK, few good cells)			b (stained good, few mitosis, separated)			a-12 hrs
9	109 P1	4	15	No			
	(a-1 stained dark)			(a-2 stained dark)		b - N.B material, not stained well)	a-12 hrs
10	"	"	"	10:24	10:34	10 min	
	a (stained dark)			b (stained OK N.B. material)			a-12 hrs
11	A64	2 hrs 15 min	17	No			
	a+b (Chromo not stained						
12	"	"	"			10 min	a-12 hrs
	a (stained good, very good cells)			10:27	10:37	b - N.B. material	
13	"	4	15	No			a-12 hrs
	a (stained OK. N.G. cells.)			b (stained dark, few mitosis)			
14	"	"	"	10:31	10:41	10 min	a-12 hrs, b-72 hrs
	a (stained fair, dark. N.G. cells)			b stained dark, N.B. cells.			

3 Meyer method (Lost material)

4 a-1 - Kodani method (Fair)

4 a-3 - 45% acetic, absolute alcohol (N.G. - gelly like)

4 a-2 Meyer method (O.K.)

5 1 part Bouin acetic acid - 1 part absolute alcohol, absolute alcohol (fair)

6 a-1 Kodani good

6 a-2 Meyer Good

8 absolute alc. (good

9 a-1 Meyer a-2 same as 4 a-3

10 Meyer

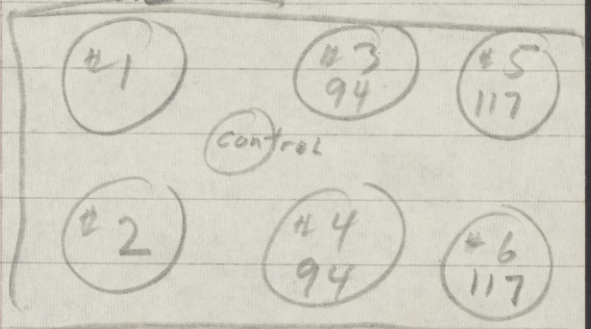
13 absolute alc (N.G.)

14 meyer (heated)

		PDB	Camry	HCl in	HCl out	Ontario
#1	4255 P1	1½ hrs	22 hrs 20 mn	9:28	9:38 + 10 m	10:15
#2	"	2 hrs	22 hrs	9:30	9:40 + 10 m	
#3	"	2½ hrs	21 hrs 25 m	9:32	9:42 + 10 m	
#4	K-1	2 hrs	22 hrs	9:35	9:45 + 10 m	
#5	258	2 hrs	22 hrs	9:37	9:47 + 10 m	
#6	R9P6	2 hrs	22 hrs	9:41	9:51 + 10 m	
#7	R10P1	2 hrs	21 hrs 20 m	9:49	9:59 + 10 m	
#8	109 P2	2 hrs	21 hrs 15 m	9:53	10:03 + 10 m	

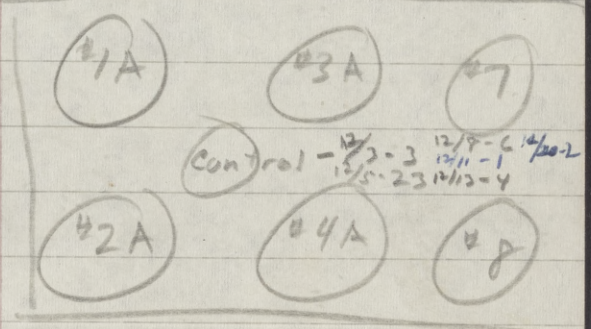
11/23/73

Seed No.	Germination	
117	~~12/3-11~~ 11/28-11	11/30-3
113	11-5	11/30-1
94	11-0	11-0
Home	11-1	11/30-2



½% NACLO

25/150 ½ 117	12/3-1 11/28-19	11/30-3
113	11-7	11/30-2
94	11-1	11-0
Home	11-0	11-0

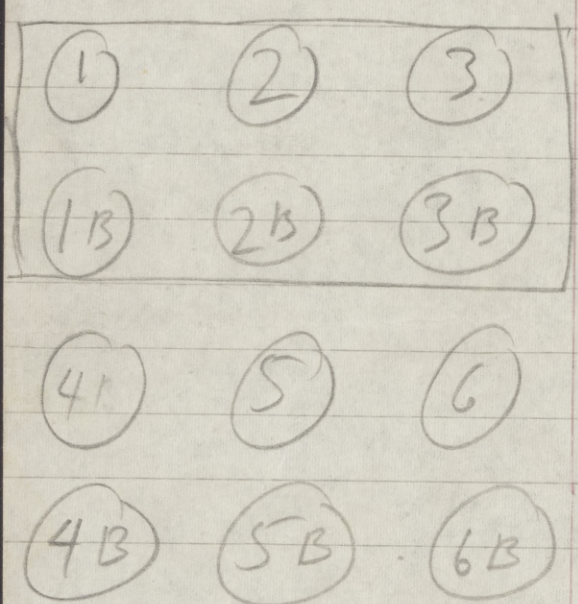


11/30/73

			Time
#1	Hugh	1% NACLO	½ hr.
#2	Hugh	½% "	1 hr.
#3	94	1% "	½ hr
#4	94	½% "	1 hr.
#5	117	1% "	1 hr
#6	117	½% "	½ hr
#1A	1 mo. Home Fresh	1% "	½ hr. 12/5-3 12/11-1 12/8-9 12/20-3
#2A	"	½% "	1 hr. 12/8-10 12/20-1 12/5-3 12/11-1
#3A	" Old	1% "	½ hr. 12/8-3 12/11-4
#4A	" Old	½% "	1 hr. 12/8-3 12/13-3 12/11-3
#7	Hugh	1% "	1 hr 12/3-6 12/8-18 12/13-1 12/5-40 12/11-3
#8		½%	½ hr 12/3-11 12/8-10 12/13-5 12/5-9 12/11-3

12/6/73

1	47	1%	NACLO	½ hr	12/9-6 12/11-12	12/13-13 12/20-8	39	12/8-4	
1B	68	1%	"	½ hr	12/8-9 12/9-17	12/11-29 12/13-7	12/20-11	73	12/28-1
2	78	1%	"	½ hr	12/8-1 12/9-9	12/11-33 12/13-14	12/20-3	60	
2B	83	1%	"	½ hr	12/8-5 12/9-28	12/11-24 12/13-17	12/20-10	84	12/28-1
3	4	1%	"	½ hr	12/9-8 12/11-23	12/13-9 12/20-4	44		
3B	593	1%	"	½ hr	12/9-0 12/11-0	12/13-0	0		
4	196 (65x)	1%	"	½ hr	12/9-12 12/11-14	12/13-14 12/20-16	56	12/28-2	
4B	117	1%	"	½ hr	12/9-1 12/11-0	12/13-5 12/20-7	13	12/28-3	
5	196	1%	"	1 hr	12/9-3 12/11-13	12/13-17 12/20-18	51	12/28-5	
5B	117	1%	"	1 hr	12/9-0 12/11-0	12/13-2 ~~12/20-13~~	2	12/28-2	
6	117	½%	"	1 hr	12/9-0 12/11-4	12/13-1 12/20-2	7	12/28-1	
6B	196	½%	"	1 hr	12/9-6 12/11-8	12/13-12 12/20-13	39	12/28-10	



DEPARTMENT OF AGRICULTURE, WESTERN AUSTRALIA.

REPORT ON GUAYULE PLANTINGS MARCH 1959 TO FEBRUARY 1960

E.N. Fitzpatrick, M.Sc.Agric. Research Officer.

SEEDINGS

During 1959 seedings of the 4265 X strain of guayule were made at Wembley Research Station, Canarvon and Esperance.

At Wembley pregerminated seed was sown on ~~March~~ Sept 25th, ~~April~~ Oct 6th and ~~April~~ Oct 10th. Emergence took 6 days. The seedlings were damaged by wind blast on ~~April~~ Oct 25th and 26th. Growth was slow due to low temperatures.

Small areas were direct sown on ~~April~~ Oct 6th. These plantings were relatively successful.

The emergence of some of the ~~March~~ Sept 25th sowing was reduced by a mulch of rotted horse manure. In later plantings horse manure mulching was not used.

It was found necessary to use "Tetroc" or "Ceresan" in the incubators to prevent mould damage to seeds being pre-germinated.

At Carnarvon plantings were made on ~~June~~ Dec 12th and 16th and in the first week of ~~July~~ Jan. These seeds were all direct sown and covered with sand. Germination was very good. Under the warm conditions growth was excellent. Drought hardening of these seedlings was commenced on ~~Sept~~ March 24th. However judging by the size of plants received in Perth in ~~December~~ June this hardening was only partially successful.

Temp difference?

In ~~July~~ Jan 2½ ounce of seed was direct sown through a 12 run seed drill into virgin sandy surfaced soil at Esperance Plains Research Station. The area was harrowed down to a firm fine seed bed. The seed was rolled, very lightly harrowed or left uncovered. In one experiment it was sown in every 4th run with Dwalganup sub clover in the 3 intermediate runs. The seed was mixed with super for sowing. There was no significant germination on any of the sowings.

TRANSPLANTING.

(a) Southern Areas.

The following plantings of guayule have been made with seedlings grown at Wembley Research Station.

20%	Forests Dept. Kalgoorlie	- 110 seedlings planted ~~Sept~~ March 25th
20%	E. Smart, Mingenew	- 500 seedlings planted ~~Oct~~ April 1st
10%	Esperance Plains Res.Stn.	- 2000 seedlings planted ~~Oct~~ April 1st
40%	K. Frearson, Jerramungup	- 2000 seedlings planted ~~Oct~~ April 15th.
73%	Mrs Grigg, Scaddan	- 500 seedlings planted ~~Oct~~ April 7th.

Due to the cool conditions following seeding the plants were not as large as desirable. The crown diameter of the plants was as below.

Mingenew - all plants greater than 1/8 inch
Esperance - range 1/16 - 3/16 inch
Jerramungup - range 1/16 - 1/8 inch
Scaddan - range 1/16 - 1/8 inch.

Following 5 inches of rain during ~~November~~ May, 200 seedlings from Carnarvon were planted at Esperance Research Station on ~~December~~ June 6th. These had crown diameters ranging from 1/4 - 1/2 inch.

The ~~September/October~~ March/April plantings were ¾ topped and were planted with the tops plus half an inch of root showing.

Some of the ~~December~~ June plantings at Esperance were completely topped. Half of these plants were planted with ⅛ - ¼ inc of stem showing and half with the top of the stem just below the ground surface.

The remainder had ⅞ or more of the tops removed.

All seedlings were packed as recommended by Erickson & Smith (1947). The Plants were packed in single layers, with the tops on the outside and roots to centre, separated by sheets of waxed paper into a box lined on all sides with waxed paper. The maximum time from pricking to planting was 4 days; the minimum 36 hours.

(b) Northern Areas.

Plantings will be made during the next month at the following centres. Carnarvon seedlings will be used.

West Kimberley

Mt.Anderson Station	-	80 m S.E. from Derby.
Nowanjum Mission	-	Derby
Nicholls farm	-	Derby
Broome's Pindan	-	20 m E of Broome
Nita Downs Station	-	150 m S.W. from Broome.

Port Hedland

Munda	-	50 miles E. of Pt.Hedland.

Wiluna

Lorna Glen Station	-	100 m. E. of Wiluna

Instructions have been forwarded to Carnarvon that ½ of the plants for each centre should be completely topped, and ½ should have ⅞ of their top removed.

Only plants with crown diameters greater than 5/32 inch are to be used.

Roots are to be pruned to 6-8 inches.

The officers doing the transplanting have been instructed to plant 1/3 of the completely topped group with the cut surface ¼ inch below ground, ⅓ with cut surface at ground level and ⅓ with half an inch of root exposed.

Some seedlings of the ⅞ topped group are to receive sulphate of ammonia, some are to receive super and some both super and sulphate of ammonia.

In the event of drought arrangements are to be made for some plants to be watered every two weeks for the first 8-10 weeks after transplanting.

The seedlings are to be packed in the same way as those for southern areas were packed.

REPORTS ON SOUTHERN PLANTINGS.

Progress reports have been received on all plantings. The most recent report from Mingenew was on ~~Dec~~ June 10th; Esperance ~~Sept~~ March planting on ~~Dec~~ June 11th, Esperance ~~December~~ June planting on ~~Jan~~ July 8th, Scaddan ~~Jan~~ July 8th and Kalgoorlie ~~Dec~~ June 30th. The last report from Jerramungup was on ~~November~~ May 12th.

At Jerramungup 40% of the plants were classified as alive, 40% doubtful and 20% dead.

At Mingenew only 20% of the plants have survived; the remaining 80% were classified as dead. The surviving plants have made very little growth, were between 2 and 3 inches high and had not commenced to branch.

At Esperance only 10% of the ~~September~~ March sowing were showing any signs of growth but even these plants are poor. The roots of the remaining 90% were sound and only the above ground part has withered. The Research Station Manager considers that these could grow as the weather warms up.

Of the ~~December~~ June planting 16% are 1-2" high, 22% have a few small leaves and 62% have made no sign of growth tet. No effects of the various treatments are apparent yet.

At Scaddan 73% of the plants have survived. Of these 60% are 4-6 inches high and flowering. The plants have not branched extensively. The stems are approximately half an inch in diameter. The remaining 40% have made little growth but the young leaves appear healthy. No difference has been noted in the survival of the small and large seedlings.

At Kalgoorlie only 20% of the seedlings survived.

GENERAL COMMENTS.

Due to the late seeding the seedlings were smaller than desirable.

Transplanting was delayed due to the small size of the seedlings and the dry seasonal conditions during early ~~September~~ March and excessively wet conditions in late ~~September~~ March.

It seems likely that planting good size seedlings in the last 2 weeks of ~~August~~ Feb is more likely to give successful results.

Because of the higher temperatures in ~~September/October~~ March April it is unlikely that the plants were sufficiently "hard" at planting. This could present problems in the northern plantings. For this reason speed from pricking to planting may be important.

The better growth of the plants at Scaddan than at Esperance Research Station suggests some nutritional problem; perhaps nitrogen.

Seasonal conditions on the south coast have been

extremely favourable since ~~October~~ April. On the other hand they have been very unfavourable at Mingenew since ~~August~~ Feb.

1960 SEEDLINGS.

On ~~Jan~~ July 12th and 26th seed was direct sown into seedbeds at Wembley Research Station. Strains 4265 X and 593 were sown on ~~Jan~~ July 12th. Strains 4265 X, 11635, 11591, A.48124 and N 396 were sown on ~~Jan~~ July 26th.

The effect of various covering treatments, (yellow sand, white sand, gravel and bluemetal), of sacking with gibberellic acid, of seed protectants (tetroc, cerasan and fennasan) and of spraying with zineb are being investigated. Some plots had rotted fowl manure dug into them 3-4 weeks prior to sowing and some did not.

Germination of all strains except 4265 X has been very satisfactory.

Gibberellic acid appeared to improve the germination of 4265X in the ~~Jan~~ July 12th sowing so all the ~~Jan~~ July 26th sowings were soaked in it.

White and yellow sand are satisfactory covering materials.

Tetroc and furnasan appear to be safe seed protectants under all conditions. There was no germination on the plots which had both Gibberellic acid and ceresan. Seed without fungicide has germinated satisfactorily.

The seed took 4-5 days to germinate and the plants have made very good growth since. Strain 593 which germinated on ~~Jan~~ July 16th was nearly an inch high on ~~Feb~~ Aug. 4th.

There should be sufficient plants for any transplantings required in ~~August~~ Feb this year.

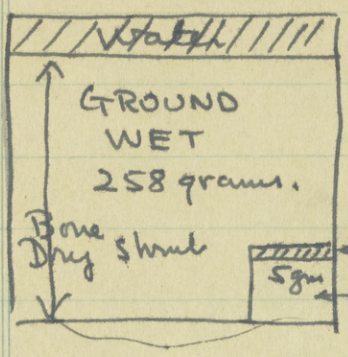
5.2.60
ENF:EH.

Native Welfare Dept
23 4401
176 Wellington

Baileys Furriers
146 Murray St
213395

MANZ 3324

Plant
3



$\frac{1}{2} = \frac{50 \text{ dry}}{100 \text{ wt}} = 50\%$

$253 \times \frac{1}{2} =$

$\frac{5 \text{ gms}}{253} \xrightarrow{\text{dry}} \frac{3.528}{x}$ (B.D.S. Total)

$x = \left(\frac{3,528}{5,000}\right) \times 253 \text{ grams}$ (Total Wt of Dry Shrub Milled)

fraction

50%

$\frac{50}{100}$

$\frac{5}{10} = .50 \times 100 = 50\%$

wt of Plug = .546 grams.

assume 35% Resin & 65% Rubber.

wt of Rubber in the Plug = $.546 \text{ gram} \times .65$ (6,980)

$\therefore$ % of Rubber (dry basis) = $\frac{\text{wt. of Rubber}}{\text{wt. of Dry Shrub}} \times 100$

$\frac{10}{\frac{1}{2}} = \frac{2 \times 10}{1} = 20$

$= \frac{.546 \times .65}{\frac{3,528}{5,000} \times 253} \times 100$

6.98 wt. of Plug — get D.S. analysis of Plug. — wt of moisture det. samples

$= \frac{.546 \times .65 \times 100 \times 5,000}{3,528 \times 253} =$

Total wet wt of shrub milled

dried wt of moisture sample

$3.2 \times$

$2.5 \times$

2.5

Watch for characters to isolate.

---

hair type → isolate it

get a mariola hair in guayule if you can with no other mariola characters. This institutes isolation of gene for hair shape.

Because this may fail in hair shape, carry out similar program with any other promising characters.

Any morphological character which proves to be linked to a significant chemical character will be a great time saver, so watch for it.

The above is first justification for the labor of isolating genes. Second is in order to build up a good stock of plants with isolated single genes.

If a useful character turns up in 72 strain, try to get it into 36 type by repeated back-crossing.

To test whether a single gene has been isolated, back-cross to wild type or standard (36 chr.) and look for 1 to 1 ratio of standard & character being tested.

Watch P1 x P4 cross for a wild-type in F1, because this would reveal presence of two non-allelic genes for pale green. Also recessive.

Write Powers for a 36-chromosome wild-type

Write Rollins first.

MANE 3329

Dr Emerson + Hugh Anderson went to Emergency Rubber at Salinas where the government was growing thousands of acres of guayule. Mr Hugh Anderson eventually Dr Emerson to get some guayule plants and seed for our project in Manzanar. They were very reluctant to give us any but somehow Dr Emerson + Hugh Anderson managed to get enough to get started with the experiment. It was mostly culls, tops of a guayule plant that was cut off. The Manz. groups headed by Mr Hata got some sands from the river bed and stuck the tops of the guayule in the sands and made it root. It was the first time anyone was able to reproduce guayule by cuttings. Not all guayule have rubber in them, with cuttings we can have all plants that will have rubber in them by making cuttings from a rubber producing plants.

E.R.P at Salinas was using a pebble mill process to crush the shrubs to a pulp. (A pebble mill is a tank with a round rocks in it and rotated so that when the rocks fall on the ?) Shimpei and his team tried the jordan mill which is used for paper making. The jordan mill was much faster. Later Mr. Kimura designed a machine that proved to be better than the jordan mill. Mr. Kimura had Mr. Jo Iwamasa assisting him.

Shimpei, Frank Hiroaka and the rest of the team produced a rubber superior to Hevea or tree rubber a rubber produced at Salinas. That caused the E.R.P to resent the fact that they were upstaged shown off by the Japanese. they told the F.B.I. to investigate. The project was shut down for a while but our Camp director Mr. Ralph Merritt fought for us and got the project going again.

Not all personal in the guayule project were Japanese Americans, many Issei participated.

The rubber produced in Manzanar tested on a machine with the tree rubber and Salinas rubber. Salinas rubber pulled about 3,700 lbs per sq. in.

Tree rubber 4,000 " " " "

Manzanar 5,150 " " " "

Dept of Agri was impressed enough that it had ordered a copy of the Kimura mill on a larger scale for its own use at Salinas. Guests were invited to see the test run of the new mill. It was very successful. None of the Japanese from the Manzanar group was invited

We realized had a geneticist Masao Kodani here U.C. Berkeley. I'll throughout me how to start the cell [illegible]

towards

They never mentioned or indicate that the process was developed by the loyal Japanese and Japanese American in the concentration camp

Not all personnel in the project were Japanese Americans, many Caucasians participated to show that they are loyal to America.

In closing, we must never forget people like Dr. Robert Emerson, Mr. Hugh Anderson, Rev. Nicholson - Dr Robert Millikan, Mr. Ralph Merritt and others who helped us tremendously during the time of our needs.

Mr. Hugh Anderson is also a Quaker. He + Dr. Emerson worked very hard to make the guanle project a success.

Dr. Millikan let Dr Emerson take supplies needed in the lab.

Our camp director Mr. Ralph Merrit supported us all he can.

I'm sure most of you remember Rev Nicholson. He brought things that was stored back home on his truck to the camp

William Lloyd Garrison Founder of the liberator anti slavery paper

Ralph W. Emerson Philosopher + Poet

MANZ 3329

FOREST DEPARTMENT, KALGOORLIE

February 11, 1960

On September 25, 1959, 110 seedlings of 6 month from Wembley Research Station was planted. About 20% of it Survived. One of the official at Kalgoorlie Reasearch Station by the name of Mr. Brockway, stated that when the seedlings arrived to be planted, most of them were dried out.

The surviving plants here were growing very good. Plants were 6" to 8" tall with many of them in flower.

The reason the plants were doing well was because they were watered regularly since transplanting. The officers there were requested not to water them and that the plants were to be tested for survival without hand watering. Apparently, the man in charge there didn't get the request straight or were other reason.

The soil was very red and sandy loam. One could walk on it right after watering and it won't be muddy and sticky. This soil ran very deep and drained well.

The plants were planted in a 2 feet diameter hole with the surface of the soil right by the plants three to four inches below the surface surrounding the hole.

Following are the rainfall and temperature just before and after transplanting.

	RAINFALL	TEMPERATURE			
Month	Inches	Average Minimum	Average Maximum	Highest	Lowest
September	.34	48	70.8	86.8	36.1
October	.11	52.2	79.6	89.1	43.6
November	.79	56.5	85.6	105.1	46.
December	1.63	57.4	83.9	97.8	46.
January	2.27	62.4	90.3	106.	50.8

(Average rainfall 9.46)

K. FREARSON, JERRAMUNGUP

February 9, 1960

On October 15, 1959, 2,000 seedlings of about six to seven months old from Wembly Research Station were planted. The crown diameter of the seedling were 1/16 to 1/8 inch. In September, before the seedlings were planted, 6.30 inches of rain fell. On October 17th, two days after planting .29 inch of rain fell and .57 inch on October 27th.

Following are the rainfall totals just before and after transplanting.

September	6.30 inches
October	1.66 "
November	4.50 "
December	1.25 "
January	2.50 "

Jerramungup is about 50 miles from the sea. Constant wind blowing with gale any time of the year. The soil is sandy with average depth of twelve to eighteen inches, and yellow clay subsoil. Roots were poor, only went down as far as the clay. About ten percent of the plants survived.

Plants were 3 to 4 inches high with some plants with the crown 1" to 1½" above surface. Evidence of erosion, probably by rain water caused some of the crown being so high. The plot was very weedy and uncared.

180.05
4.00
9.

April 9, 1945 Travel by Akira T. Kageyama in connection with jungle research from Jan 26, 1945 to April 1st 1945 Travel was by private automobile owned by A.K., make Buick license # 51R258

Date	Start	Destination	Odometer Reading Start	End	Mileage
Jan 26'45	Pas.	Manzanar, Calif	30246	30447	201
" 30	Manzanar	Pasadena	30453	30652	199

Round Trip To Arcadia Farm From Caltech

Date	Odometer Reading Start	End	Mileage	Date	Odometer Reading Start	End	Mileage
Jan 31	30666	30676	10	Mar 21	31005	31015	10
Feb 5	30694	30705	11	" 23	31021	31031	10
" 6	30711	30721	10	" 26	31037	31047	10
" 8	30729	30739	10	" 28	31053	31064	11
" 12	30750	30760	10	" 30	31071	31081	10
" 19	30768	30778	10	~~April 2~~	~~31088~~	~~31098~~	~~10~~
" 21	30784	30794	10	~~" 4~~	31104	31115	11
" 23	30805	30816	11	" 6	31121	31131	10
" 26	30829	30839	10	" 9	31137	31147	10
" 28	30845	30855	10	" 11	31153	31163	10
Mar 2	30863	30873	10	13	31169	31179	10
" 5	30885	30895	10	16	31185	31195	10
" 7	30901	30912	11	18	31202	31212	10
" 9	30920	30930	10	20	31218	31229	11
" 12	30939	30949	10	23	31235	31245	10
" 14	30955	30965	10	25	31252	31262	10
" 16	30971	30981	10	27	31268	31278	10
" 19	30989	30999	10	30	31284	31295	11

Manzanar

May 18	31438	31639	
" 21	31645	31864	
May 2	31301	31312	11
4	31318	31328	10
7	31334	31344	10
9	31350	31360	10
11	31366	31376	10
14	31391	31401	10
16	31410	31420	10
17	31428	31438	10
22	31864	31874	10
24	31885	31895	10
26	31901	31911	10
28	31920	31930	10
30	31936	31946	10
June 1	31952	31962	10
" 4	31977	31987	10
6	31993	32004	11
8	32010	32020	10
11	32037	32047	10
13	32063	32073	10
15	32092	32102	10
23	32275	32285	10
25	32377	32387	10
27	32479	32490	11
29	32582	32592	10

MANZ 3329

April 10, 1945

Travel by Akira F. Kageyama in connection with gnagule research from Jan 26, 1945 to April 1, 1945. Travel was by private automobile owned by Akira F. Kageyama, make Buick, license #51R258

Date	Start	Destination	Odometer Reading Start	End	Mileage
Jan 26'45	Pasadena	Manzanar, Calif	30246	30447	201
" 30'45	Manzanar	Pasadena	30453	30652	199

Round Trip To Arcadia Farm From Caltech

Date			
~~Jan 31~~			
Jan 31	30666 from	30676	10
Feb. 5	30694 to	30705	11
" 6	30711 from	30721	10
" 8	30729 to	30739	10
" 12	30750 from	30760	10
" 19	30768 to	30778	10
" 21	30784 from	30794	10
" 23	30805 to	30816	11
" 26	30829 F	30839	10
" 28	30845 T	30855	10
Mar 2	30863 F	30873	10
" 5	30885 T	30895	10
" 7	30901 F	30912	11
" 9	30920 T	30930	10
" 12	30939 F	30949	10
" 14	30955 T	30965	10
" 16	30971 F	30981	10
" 19	30989 T	30999	10
" 21	31005 F	31015	10
" 23	31021 T	31031	10
" 26	31037 F	31047	10
" 28	31053 T	31064	11
" 30	31071 F	31081	10

Total 634 miles

@ 5¢ per mile .05

$31.70

265
423
688
.05
$34.40

2304
201
149
34